REVIEW/
STS-MBS-SR Receiver

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THE TWICE PER MONTH BUSINESS JOURNAL OF TVRO

# COOP'S SATELLITE DIGEST

JUNE 15, 1984

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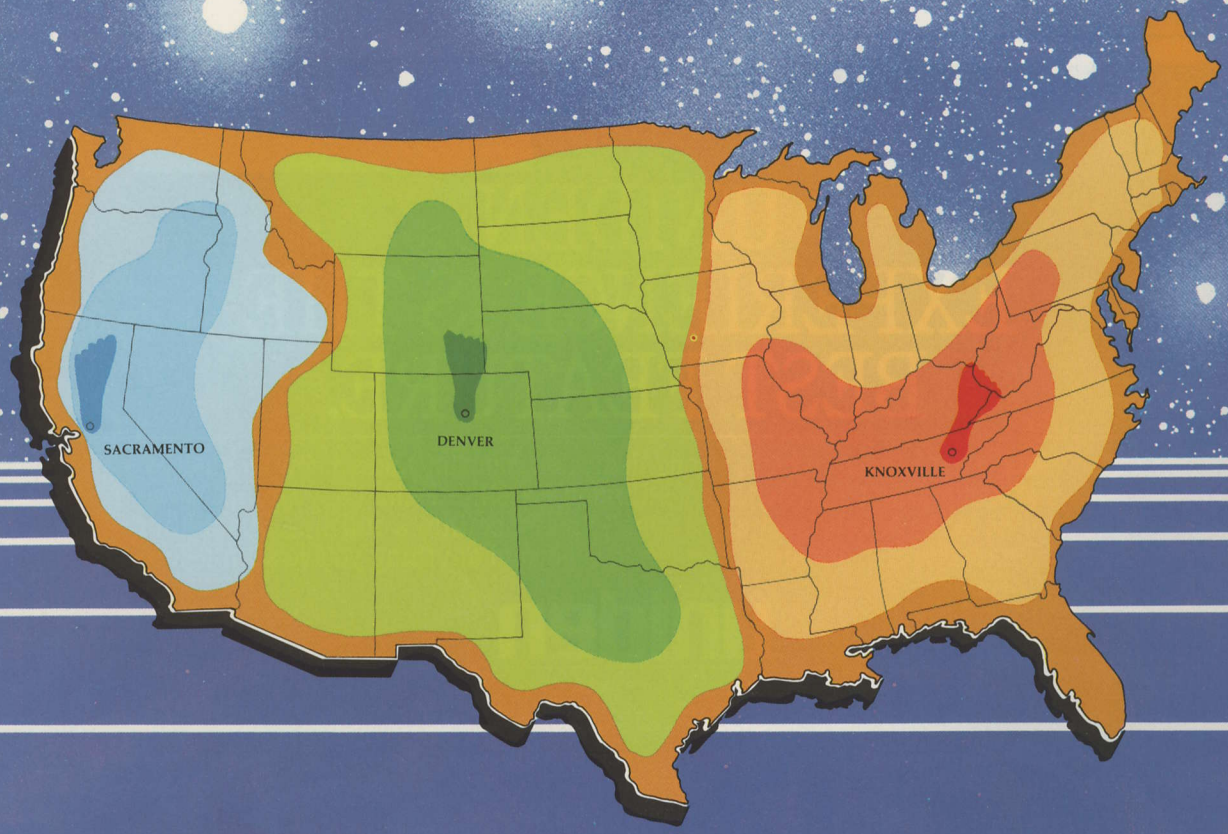


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**A POSITIVE STEP . . .**

Late in April as I was attempting to edit into a coherent piece some videotape that we shot in Sri Lanka last fall, it occurred to me that this industry would be celebrating its **'Fifth Birthday'** soon; October 18, 1979 to be exact. There are those who may wonder how an industry like TVRO could have a birthday, much less establish a specific date for that birthday. So please allow me to explain.

When I installed my first home TVRO, in the summer of 1976, and went to the FCC for a 'license' for that TVRO, I was the first to ever do so. **"We have no guidelines to allow us to license a** PRIVATE **TVRO,"** they told me. We looked down deeper into the rules and found a section that allowed the FCC to grant an experimental license, for one year at a time. **"I'll take that one . . ."** said I. Sometimes you have to take what you can get.

FCC licensing of TVROs was 'mandatory' back in 1976. I thought that was foolish and in 1978 I took my concerns to Congress. I appeared before a pair of sub-committees and stated my case. I saw no reason why the FCC's 1934 rules requiring licensing of microwave systems should include licensing receive-only (i.e. **T**ele**V**ision **R**eceive **O**nly, or, **TVRO**) terminals. A receive-only terminal didn't generate any interference (single conversion receivers had not-then been invented!), and there were few other good arguments for licensing.

**The House sub-committee agreed with me and instructed the FCC to eliminate that rule.** In the fall of 1979 they did so. On October 18, 1979, the FCC decided it would no longer require licenses for 'TVRO' terminals. From that date onward, you could sell and install and operate such terminals without a license; not unlike simply sticking up a TV antenna on your house and tuning in the local channels. If there was a single date when this industry 'began,' **that was the date** and naturally I am proud that I got this rule change started by taking the case to Congress.

The last year, within the industry, has been a series of 'highs' and 'lows.' We have been high when equipment sales have gone up and up and up; we have been low when our own internal growth has set friend against friend.

**So I decided we should have a party;** a full industry 'party' where everyone can participate, communicate, and try to become 'friends' again. Hey, we are all in this TOGETHER and we need to pull together rather than pulling apart.

To make the 'party' work, I have begun arrangements for a September 4th event during the STTI/SPACE trade show. I have also begun arrangements for a special two-hour satellite telecast for the evening of October 18th (the start of our sixth year), and, I am bringing out a 200/250 page edition of CSD on October 1st. I have also done a few other things to 'bring us all BACK together' and will explain them in the July 1st CSD.

**Packed with your CSD/2 this month** is a special 10 page insert; it explains what this is all about. I urge you to read it, and then **do something about** your own participation in the 'birthday event.' We ALL need to come together as a whole industry and this is the event, and the time. **I'm counting on** you **to join me** in all of the festivities, and in making the Nashville show the biggest AND best this industry has ever held!

---

**SPACE BOARD Meets/June 05**

SPACE's Board met June 5th, Chicago, during CES to continue hammering away at the Chuck Hewitt agenda. They decided:

**1)** Reconfigure the board to 12 pioneers, 6 distributors, 6 dealers, 1 SMATV reps; no more consumers;
**2)** Close all future meetings to public and press (Johnson, Dushane voting to keep meetings open);
**3)** Empower Bob Behar to create a 'dealer survey' and Hewitt to send it out to dealer members.

**Budget,** major item, was not resolved.

**COOP'S SATELLITE DIGEST /2**

**CSD/2** — Coop's Satellite Digest published monthly by West Indies Video, Ltd., a Turks and Caicos Corporation with corporate offices located at Grace Bay, Providenciales, Turks and Caicos Islands, BWI. Sales and subscription offices maintained at Fort Lauderdale, Florida **(P.O. Box 100858, Ft. Lauderdale, Fl. 33310; telephone 305/771-0505 weekdays between 9 AM and 4 PM eastern time).** CSD/2 is issued on the 15th of each month as the mid-month companion to CSD Magazine, which since October of 1979 has provided TVRO dealers, distributors and OEMs with news of and by the industry. CSD/2 is sent AIRmail to all subscribers to CSD within the USA plus selected dealers and distributors outside the USA. CSD/2 is **also sent** to all **'Dealer Members of SPACE,'** the international trade organization for the TVRO industry. Subscription rates to CSD + CSD/2 are **$75 per year,** AIRmail, within the USA and where U.S. zip codes apply; **$85 per year** in Canada and Mexico, **$100 per year** (in U.S. funds) elsewhere. 

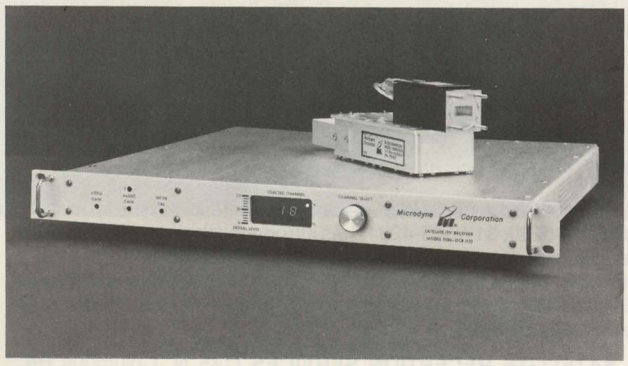
**RECEIVERS**

**CAYSON ELECTRONICS, Inc.** (Rt. 3, Box 160, Fulton, Ms. 38843; 800/892-4916) has introduced their model 2001 Centurion satellite receiver. According to Cayson, what is 'unique' about the receiver are five separate push in/pull out circuit boards for modular circuit replacement by the field technician, should a receiver problem develop. The receiver includes a signal strength meter, audio subcarrier tuning, and polarity control.


**CAYSON Centurion 2001 receiver**

**FANON, Inc.** (15300 San Fernando Mission Blvd., Mission Hills, Ca. 91345; 818/365-2531) has announced its entry into the TVRO receiver field. Two models will be available; the Fansat 2500 deluxe and the 1500 'economy' version. The 2500 has a 24 channel detent tuner, automatic polarity switching, LED channel indicator, scan mode tuning, video fine tuning, preset and variable audio tuning, and an AFC on/off switch. A pair of meters (center tuning and signal level) are on the front panel. The 1500 model has detent tuning. Both units employ a single conversion (70 MHz) IF. An optional remote control (SRC-1) is available for the 2500 unit using infrared control circuits. Fanon has been a producer of audio and intercom systems for more than 40 years.

**MICRODYNE CORPORATION** (P.O. Box 7213, Ocala, Fl. 32672; 904/687-4633) has introduced a new receiver designed specifically for use in the Canadian 4 plus 12 GHz 'combo markets.' Their model 1100 DCR-12C receiver is married to their model 1100 BDC-12 block down conversion downconverter to provide switch-selected C-band or Ku-band reception. The 1100 BDC mounts directly to the antenna feed, provides a block output in the 270-770 MHz range (compatible with present Scientific-Atlanta BDC systems or AVCOM). The equipment was first shown at the Canadian Cable Television Association show in Ottawa June 11th.



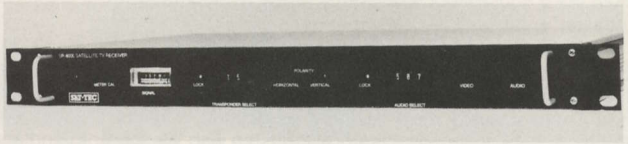

**MICRODYNE TWO-BAND receiving system**

**SAT-TEC Sales, Inc.** (2575 Baird Rd., Penfield, New York 14526; 716/586-3950) has announced their model SR-8000 block downconversion receiver. The receiver employs a 'unique' 300 MHz PLL demodulator with fully synthesized tuning for both audio and video. This (commercial grade) rack mounting receiver also features fully tunable audio from 5.0 to 8.0 MHz. It mates with model DC-3240 HS dielectrically frequency stabilized downconverter and is designed for unattended 'hands off' operation in CATV and SMATV applications. The unit is produced in the United States.

NEW PRODUCTS/ SERVICES/ EVENTS

**WINEGARD RC-7000 'Pro'**

**SRS 'Clip Art'**

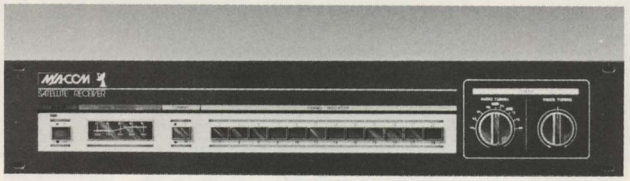



**SAT-TEC SR-8000 commercial grade BDC receiver**

**TAI FONG ELECTRIC** (P.O. Box 698, Taipei, Republic Of China/ Taiwan; (02) 7116325) has completed design and tooling for three new TVRO receivers which they are scheduled to start delivery on in October. Their Model TFS-240 is a single conversion receiver with fixed and variable audio tuning (5.4 to 8.1 MHz), crystal controlled modulator (channel 3 or 4, selectable), detent channel or optional infrared control, digital LED displays, electronic polarity adjustment and AFC. The downconverter (single conversion) has a 15 dB (nominal) noise figure with a 14 to 18 VDC supply voltage and a tuning voltage supplied through the coaxial (RG-59/U) cable.

Their model TFS-240R has similar specifications but adds the infrared remote control function as well.

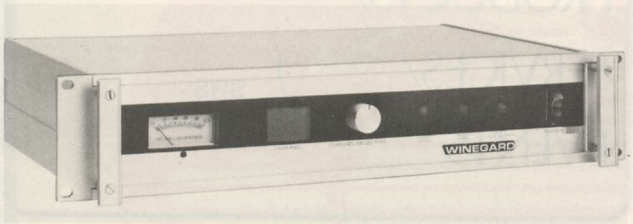
Finally, their model TFS-643 is a dual conversion, BDC receiver with a first IF of .9 to 1.4 GHz and a second IF of 70 MHz. There are 12 push buttons with vertical and horizontal switching, two fixed audio channels (6.2 and 6.8 MHz), crystal controlled RF output on channel 3 or 4 or baseband video and audio. The unit is rack mounting. A demodulator threshold of 8 dB carrier to noise is claimed for static video.




**TFS-643 from TAI-FONG**

**WINEGARD COMPANY** (3000 Kirkwood St., P.O. Box 1007, Burlington, Iowa 52601; 319/753-0121) has announced a commercial version TVRO receiver at a price which they report is '60% of the cost' of most high-end receivers. Their model RC-7000 receiver is a block downconversion unit with their model CV-7000 block downconverter with a crystal controlled, synthesized, phased-lock-loop approach.

The receiver's first IF is 1.14 to 1.64 GHz. Four sub-carrier 'pre-sets' are built-in and the receiver has an IF loop-through capability. The rack mounting unit requires 3.5 inches of vertical space and with downconverter carries a price of $1,128.50 with quantity discounts available.




**WINEGARD RC-7000 reduces high-end costs**

**DISTRIBUTOR NEWS**

**CHIEF INDUSTRIES** (West Highway 30, Grand Island, Nebraska 68801; 308/382-8820) has entered the TVRO marketplace offering 'total packaged systems' to dealers. The company is offering dishes in both the 8 and 10 foot size, with a range of electronics from 'basic' to 'deluxe.'

**MISAT SATELLITE CORPORATION** (2000 Barnes St., Penticon, BC, Canada VSA 4C3; 604/493-7168) is a new distributor operation founded by former principals in the Microlinc corporation. Orin Beebe and Trevor Clarke, most recently associated with the Wespercom Group, Ltd. have severed their relationship with Wespercom and are now operating as Misat.

**PEGASUS SATELLITE TECHNOLOGIES of Nashville** (1865 Airlane Drive, Suite 4, Nashville, Tn. 37210; 1-800-621-TVRO in Tennessee or 1-800-522-TVRO outside of Tennessee) has become a Master Distributor for Luxor North America. Their region includes the West/South Central and East/South Central portions of the country. Warranty service will be maintained from the Nashville facility.

At a recent **SATCO U.S.A.** dealer seminar attended by approximately 500 TVRO dealers, **Bob Hahn** of **Draco Laboratories, Inc.** (Grafton, Wi.) presented a DRACO Model Aimer II TVRO dish control to Jackie Standiford of Standiford C.B. Sales following a drawing. The folks at DRACO report sales on their Aimer II product have increased 'ten fold' in recent weeks.


**DAVE CROSIER** (SATCO, U.S.A.), **Jackie Standiford, and Bob Hahn of Draco.**

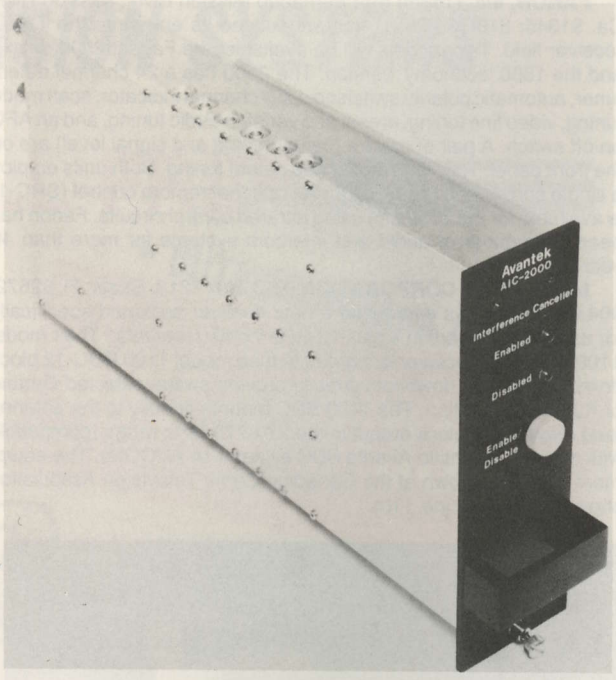
**SATELLITE DEALER SUPPLY, INC.** (690 Lindberg Drive, Beaumont, Texas 77707; 409/842-0954) has added an additional 4,200 square feet to their warehouse space to better serve the market region around southeastern Texas and southwestern Louisiana. SDS is a member of the International Satellite Distributor Association and handles Chaparral, Winegard, Uniden, California Amplifier, Automation Techniques, Pilant Manufacturing, Stardish and Vidare equipment as a 'Master Distributor.'

**SATELLITE VIDEO SERVICES** (RR# 1, Box 85-S, Paul Sax Road, Catskill, New York 12414; 518/678-9581) has announced an expanded dealer training seminar schedule for the Luxor drives and receivers, block downconversion systems, SMATV systems and the Intersat IQ-160 receiver system. Classes are now held on Wednesdays with repeat classes for basic installation techniques on the third Saturday of each month. Emphasis is on installation techniques and trouble shooting. There is no charge for the seminar sessions.

**DEALER AIDS**

**AMERICAN HOMESAT ASSOCIATION** (P.O. Box 25326, Tempe, Az. 85282) has been formed as the 'first international consumer organization' for home TVRO 'enthusiasts.' For a fee of $15 per year, AHA founder **John Stover** will provide members with a monthly 'newsletter,' free consultation for business or technical questions, 'periodic discounts on equipment and services.'

**AVANTEK, INC.** (3175 Bowers Avenue, Santa Clara, Ca. 95051; 408/727-0700, extension 2168) has announced a plug-in module for their model AR1000/2000 'Simulchannel' TVRO receivers. The AIC-2000 interference canceller plugs into the AR1000 or AR2000 receiver mainframe and is designed to cancel interfering carriers by a minimum of 20 dB each. The system functions by phase comparison and cancellation, requiring a small, secondary antenna pointed AT the interference source.




**AVANTEK AIC-2000 interference cancel module**

**REGENCY ELECTRONICS, INC.** (7707 Records Street, Indianapolis, In. 46229; 317/545-4281) has introduced their model VDS 5000 electronic video switcher which is capable of routing up to four separate video inputs to each of its two outputs. Connectors are 'F' type, LED indicators tell you 'where you are,' and an AC supply is built in. List price is $119.95.

**SATELLITE RECEPTION SERVICES** (145 N. Columbus Rd., Athens, Ohio 45701; 1-800-592-1956 nationally, 1-800-592-1957 in Ohio) has introduced a **'TVRO Clip-Art Book'** for TVRO dealers. The book contains dozens of pages of 'line drawings' and custom TVRO

**PRODUCTS/continues on page 27**

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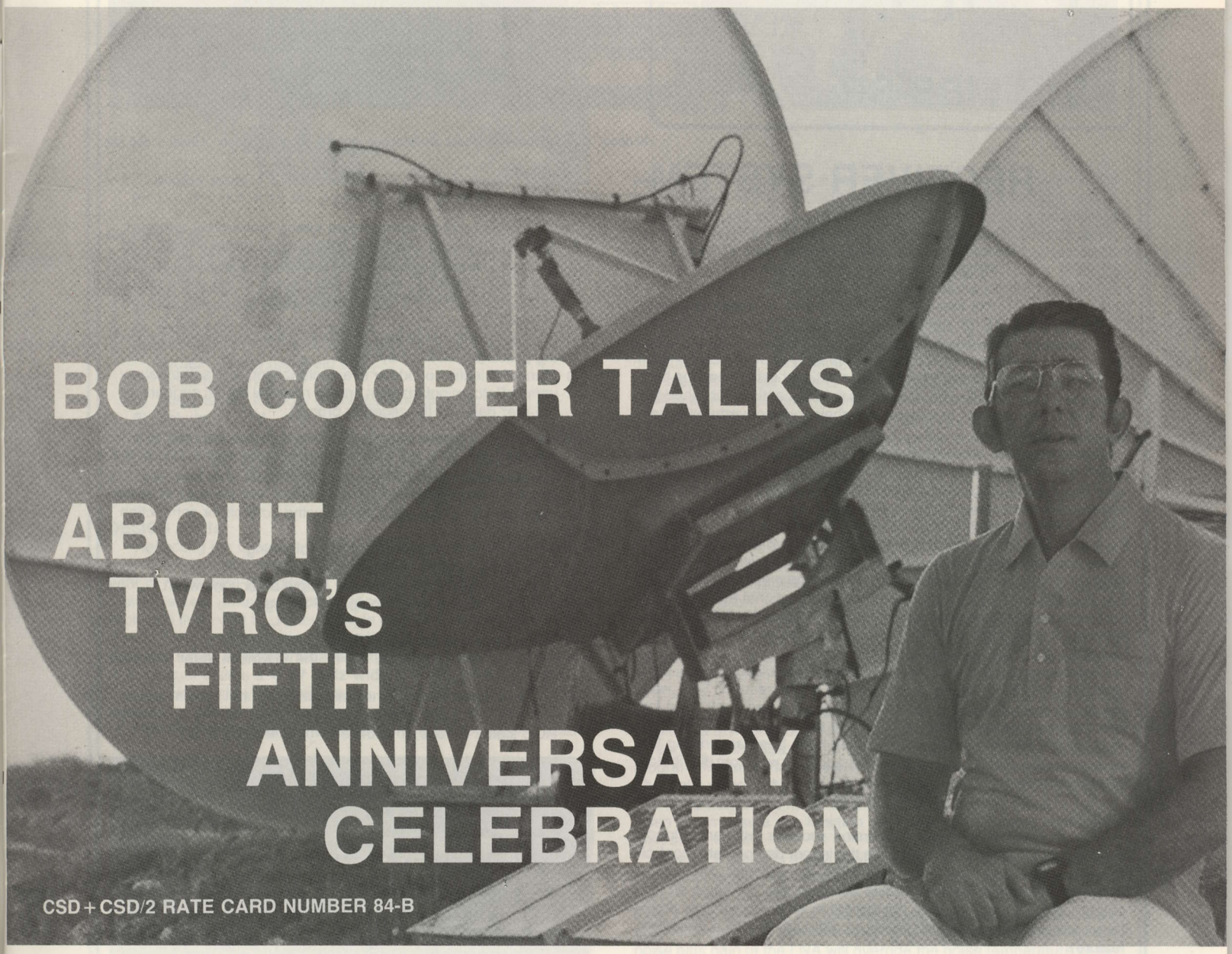


**A 10 PAGE BROCHURE WITH IMPORTANT INFORMATION FOR ALL TVRO DEALERS!**

CSD REVIEW
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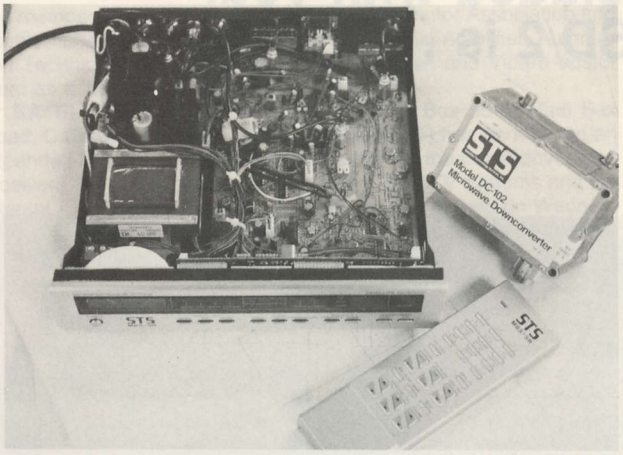
# STS MBS-SR

# RECEIVER SYSTEM




The recently introduced Satellite Television Technology Services, Inc. (2310-12 Millpark Drive, Maryland Heights, Mo. 63043; 314/423-5560) model **MBS-SR** receiver has attracted a considerable amount of attention, perhaps due to the uncertain legal status caused by a suit filed by Luxor and Magnum Microwave. STS was originally the importer into North America for the Luxor units. STS did an admirable job introducing the Swedish built receiver package, establishing a distribution system which was the envy of many. Earlier this year STS and/or Luxor decided that the relationship between the two firms should not be renewed. Luxor has subsequently established its own distribution system, in concert with their downconverter supplier Magnum Microwave.

**STS,** meanwhile, was not about to leave the business. Going to Japan, they contracted with the **Kyocera** people and by early March were ready to introduce an infrared-remote controlled TVRO receiver which had the expansion ability to also control the dish movements as well. The first of the Model MBS-SR receivers were ready for display at the March SPACE show but their public showing was stopped when Luxor/Magnum obtained a court order preventing the unveiling. Luxor/Magnum convinced the court that there might be merit to their charge that the MBS package was 'identical, or, the functional equivalent' of the Luxor. And the Swedish manufacturer maintained to the court that STS had jumped into the TVRO receiver business 'using information it had obtained while representing Luxor.'

**Subsequently the court decided** that while a 'speedy trial' was desirable, considerable financial damage might result if STS was prevented from distributing the receivers which it had contracted for with Japan's Kyocera. Which brings us to the present; STS is in the marketplace with the receiver which they have been advertising for several months and the first units have made their way from distributor to dealer hands.

**BASICS**

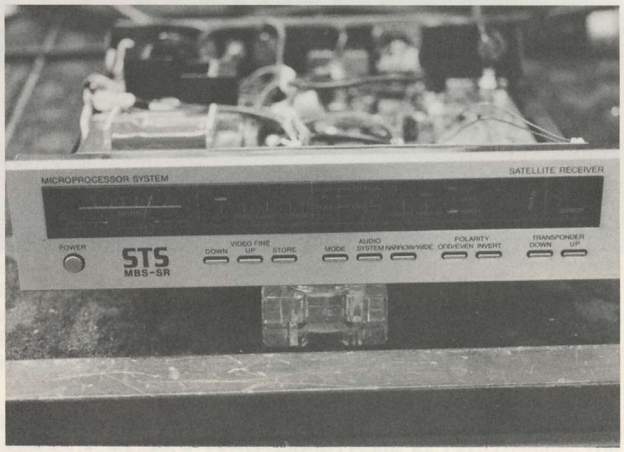
The STS-SR is a single conversion receiver with an outdoor downconverter which is connected to the indoor demodulator/control unit with a 'Siamese' (twin RG-59/U) cable configuration. The downconverter appears to be well sealed although the 'F' fittings on the output (and powering) side do not appear to be water/weather proof (most **are not** sealed against moisture although this IS a desirable feature).

The indoor demodulator has the following functions:

1) Signal strength metering (scaled from 0 to 5);
2) Video tuning (a pair of push buttons which allows you to fine tune the center tuning of the individual channel, through a voltage change to the downconverter);
3) A store position for video fine tuning (once you have properly center tuned the individual transponder, you push 'store' and the unit will then 'remember' that voltage and setting);
4) Audio mode indicators and tuning (the receiver is capable of monoaural audio, multiplex audio, matrix audio or discrete audio; there are twin NE564 phase lock loop audio demodulator circuits to allow independent tuning for discrete carriers);
5) Audio narrow and wideband selection (at the extremes, The Nashville Network will be found deviating by as much as 800 kHz — and THAT IS wide — while some of the cable music services on F3Rs TR6 are as narrow as 35 kHz — and THAT IS narrow!);
6) Interfacing with either the Chaparral or the Omni-Spectra moving-probe polarization systems;
7) Manual selection of odd or even polarization (a Westar/Galaxy versus Satcom polarization 'mode' reversal switch appears on the rear panel of the receiver proper);
8) An intricate LEDbar display system which tells the user which audio mode has been selected, which audio channel(s) is in use, the audio tunable or pre-selected mode — as selected — and the transponder number selected.

**On the rear panel** we have the following controls or connection points:

1) Scan tune or manual/remote control tuning;
2) Twin audio outputs, for stereo service;
3) Channel 3 OR 4 RF modulator output selection switch;
4) Mono (combined) audio output **(F fitting);**
5) RF output;
6) Video output **(F fitting);**
7) +18 volt DC output (to go to the downconverter via the 'Siamese' cable);
8) Three outputs related to the polarization control system (pulse, +5 VDC, ground) and an external output for the receiver's AGC signal voltage, to allow external metering on an external




**STS MBS-SR front panel is designed to catch, and hold, the consumer eye.**


**REAR PANEL provides all of the expected control connection points.**

display meter;

**9)** The IF input, from the downconverter, at 70 MHz (F fitting).

**OPERATION**

STS has designed the system so that it will be used primarily with the handheld remote control unit. The handheld unit allows the user (**after** the receiver has been pre-programmed) to do the following:

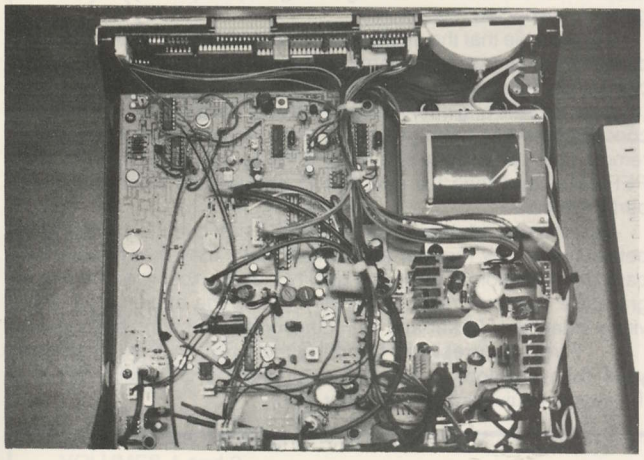
**1)** Select the desired transponder;
**2)** Select odd or even transponder polarization;
**3)** Fine tuning of the polarization system (strangely spelled "PolarotEr" on the handheld unit);
**4)** Video fine tuning;
**5)** Audio tuning for both channels (one and two);
**6)** Volume control.

With the optional dish controlling system package **(Model MBS-AA)** the remote control will also move the dish to pre-determined satellite locations. The package is designed to be complete, or 'expandable-to-complete' in the field by the dealer.

**DESIGN Briefs**

Reflecting the latest trend in Japanese engineering, the inside of the MBS-SR looks 'empty' by comparison to receivers designed a year or more ago. The present Japanese mentality is to take out as many discrete parts (resistors, capacitors, transistors) as possible, replacing them with IC or other 'single package' devices. The 70 MHz IF strip, for example no longer **looks like** an IF strip. There are none of the usual tuning adjustments; a saw filter establishes the IF bandwidth (the manual claims it is **27 MHz wide ±3 dB,** although the same manual claims the 'FM threshold' is measured in a **30 MHz bandwidth**).

The demodulator (discriminator circuit) is the now familiar coaxial cable delay line approach. A pair of lines exiting out of the center of the board wander to the rear, and dangle; making up the detector circuit.



**INSIDE the MBS-SR there is a 'shortage' of discrete parts by design.**

The modulator is a stock (Japanese) VCR modulator mounted at the rear of the board. The only discrete parts evident on the board are associated with the power supply, and the audio portion of the system (after the twin NE564 PLL audio demod units).

**PERFORMANCE**

The MBS-SR package appears to be user friendly, although the dealer installing the system may require some practice to get the hang of initial set-up. The unit comes out of the box requiring transponder alignment and while there is nothing unusual about the procedure, there is a time requirement here. Because the power supply, current regulators and associated heat generating circuits are co-located on the left hand side of the chassis, there is a fair amount of heat build-up in this region of the receiver. Without extensive (i.e. long term) testing the danger level of heat build-up cannot be determined.

Picture performance is at best 'medium grade'; a result of a not total canceling of the annoying 30 Hz flicker caused by the energy dispersal wave form and a 'pumping' of the video on solid, bright colors (such as red or light blue). STS makes an especially interesting claim for their **'FM threshold.'** For the uninitiated, FM threshold is the measurement point where the receiver is expected to provide sparklie-free reception. Unfortunately, the industry has never adopted any standards in this area (nor any other measurement area either). In the big-buck commercial world, threshold means the point where the **output video signal-to-noise ratio** 'deviates from' the input carrier to noise ratio by a non-linear function. That is, if the CNR drops 1 dB, as long as the video SNR also drops 1 dB, you have not yet reached the threshold point. When you attain a CNR level where 1 dB drop in level results in a SNR drop of greater than 1 dB, **you have just passed** the 'threshold.' This measurement can be done on moving video (i.e. programming material) or static video (i.e. a color bar test pattern). The static video, if the signal is a color bar, is the toughest test of all and there may be as much as 2 dB difference in the threshold point when you measure this function point first using moving video, and then static video.

**The STS claim** is that you will have a 50 dB signal to noise ratio (weighted) when you have an input of 14 dB CNR. They make a specific threshold claim that the threshold point will appear at "less than 7.0 dB CNR." In the real world, you install a low noise device (LNA) in front of the downconverter and hope that the combined low noise plus gain of the LNA will override the noise temperature of the downconverter. While it is theoretically possible for an LNA to overcome an exceptionally noisy downconverter, in the real world this is very difficult to do. The end result is that if you have a high noise figure on the downconverter, you are also apt to have grainy pictures; perhaps in a severe case even sparklie pictures (grain and sparklie level being two separate measurement criteria for receiver sensitivity and performance).

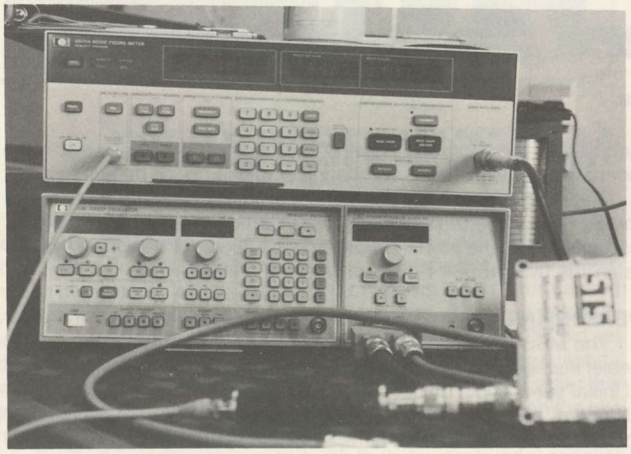
Using a Hewlett Packard **8970A Noise Figure** (test) Meter system, we measured the performance of the MBS-SR downconverter. Here is what we found:

**1)** At 3.7 GHz, the bulk-gain of the downconverter was **11.68 dB**

while the noise temperature/figure was **25.00 dB;**

2) At 3.95 GHz, the bulk-gain was **10.99 dB** while the noise temp was **25.99 dB;**
3) At 4.2 GHz, the bulk-gain was **9.8 dB** and the noise temperature was **27.08 dB.**

Now, our test opportunity was with a single, stock receiver obtained through normal distributor channels. There is always the danger that the unit obtained in this manner **will not be representative** of the bulk of the units in the distribution chain. **We therefore caution dealer-readers** that while our measurements are 'solid,' there may well be better (or worse) units in the field.



**NOISE FIGURE test for the downconverter performed on a Hewlett Packard 8970A test set revealed we were in the 26 dB region with around 11 dB of downconverter gain.**

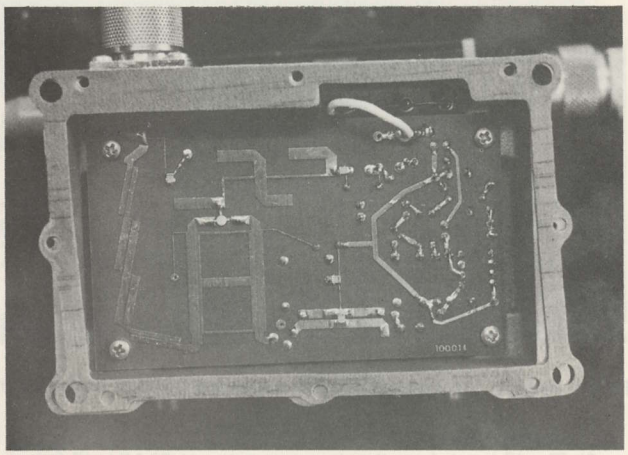
For the less-than-fully-experienced, what do the above noise and gain figures mean? Using competitive downconverters as a model, we find that the normal range for downconverters is 15 to 18 dB noise figure. An exceptionally good downconverter would have a noise figure in the 12-13 dB region (see **CSD** for August and September 1983). Higher noise figures are not uncommon, but they do make field installations desirous of producing high quality, sparklie and grain free video, more difficult (if not impossible).

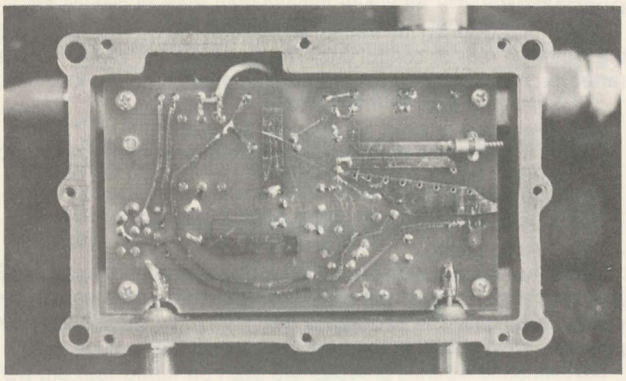
In the gain department, you should have sufficient raw voltage gain to drive the output (70 MHz) signal through the coaxial cable line to the indoor demodulator. A typical number falls in the 15 to 20 dB region.

The downconverter design is the key here to good performance. As the photos here show, there is nothing exotic about the downconverter (if you are familiar with downconverter design, you will quickly recognize all of the basic elements here).

Beyond the video, there is the usual concern about how well the audio section performs 'at the extremes.' The manual tells us that the narrow band selective position is for a 200 kHz bandwidth while the wideband is for 400 kHz. This covers most of the normalized transponders but falls far short of the extra wide deviations found on The Nashville Network, for example (800 kHz), and the extra narrow deviations found hidden inside of the WTBS (F3R, TR6) baseband signal (down to 35 kHz in the extreme examples).

**The audio section of the STS MBS-SR is good,** but it (like many others married to the 200/400 kHz 'positions') cannot handle the extremes. On the extra wide deviations you suffer a tinny-sounding chatter on hot musical chords. On the extremely narrow deviations, the 200 kHz bandwidth manages to capture not only the desired audio channel (at a reduced audio level since the discriminator is only being 'tickled' by the narrow deviation) **but also** 'chatter' from other, close-spaced (narrow deviation) carriers. The sound you hear is marred by a periodic 'clunk-clunk' as the adjacent close spaced channels hit their own modulation peaks.





**4 GHz Input/ 70 MHz output sides of the downconverter are pretty straightforward in design. Perhaps our unit was not factory-typical.**

## SYNOPSIS

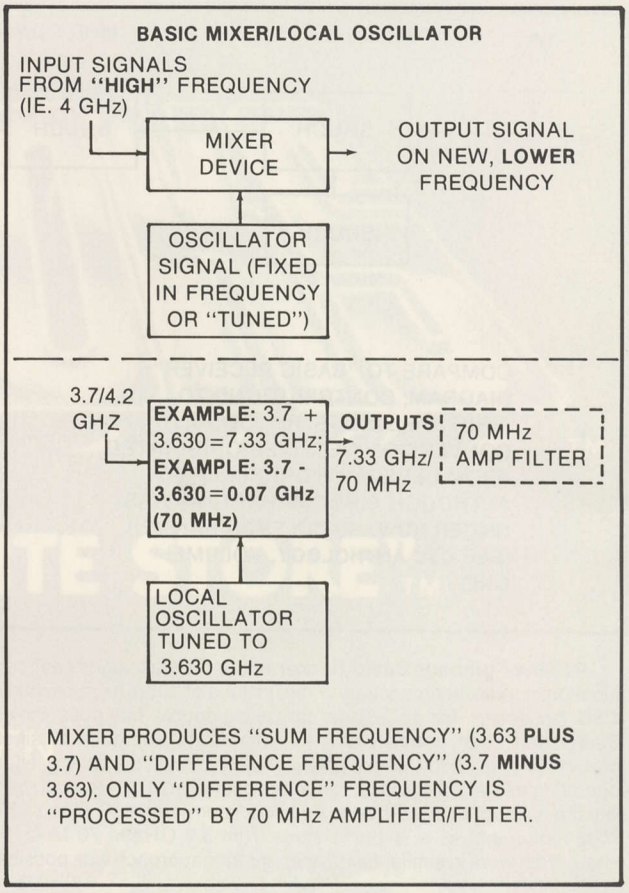
The STS MBS-SR receiver comes from a Japanese manufacturer who has an excellent technology base for mass production of units. The production qualtiies are superb and the assembly will delight dealers who are tired of hassling through layer upon layer of parts to get to a suspected resistor.

It is possible that the package we obtained for test through normal distribution channels is **not representative** of the typical performance of the units. However, an inspection of the apparent design philosophy (through reverse engineering) suggests that **perhaps** the engineering concentration has been placed on reducing parts count, optimizing remote control functions and making the system 'user friendly,' with PERHAPS less than full attention to the ultimate video and audio performance.

**Dealers are advised** to do their own side by side comparisons between this new receiver and others which they now handle. Pay particular attention to the video quality looking closely at the picture grain, the apparent receiver sensitivity, and the appearance of the video in terms of flicker and 'pumping' on large, bright, solid colors.

**If you are presently handling** the Luxor units, **you can form your own opinion** as to whether or not the STS MBS-SR is a 'functional equivalent' to the Luxor units.

# DIGITAL DIVIDING/ RECEIVER OF THE FUTURE?



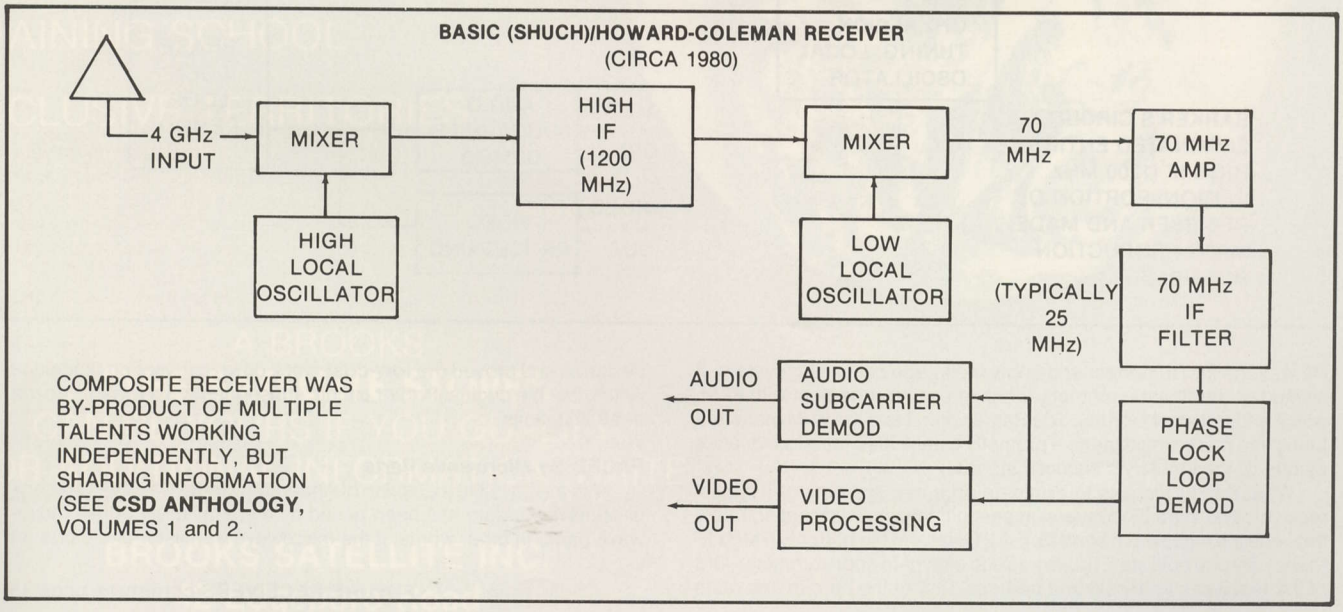

**CHANGES Are Coming**

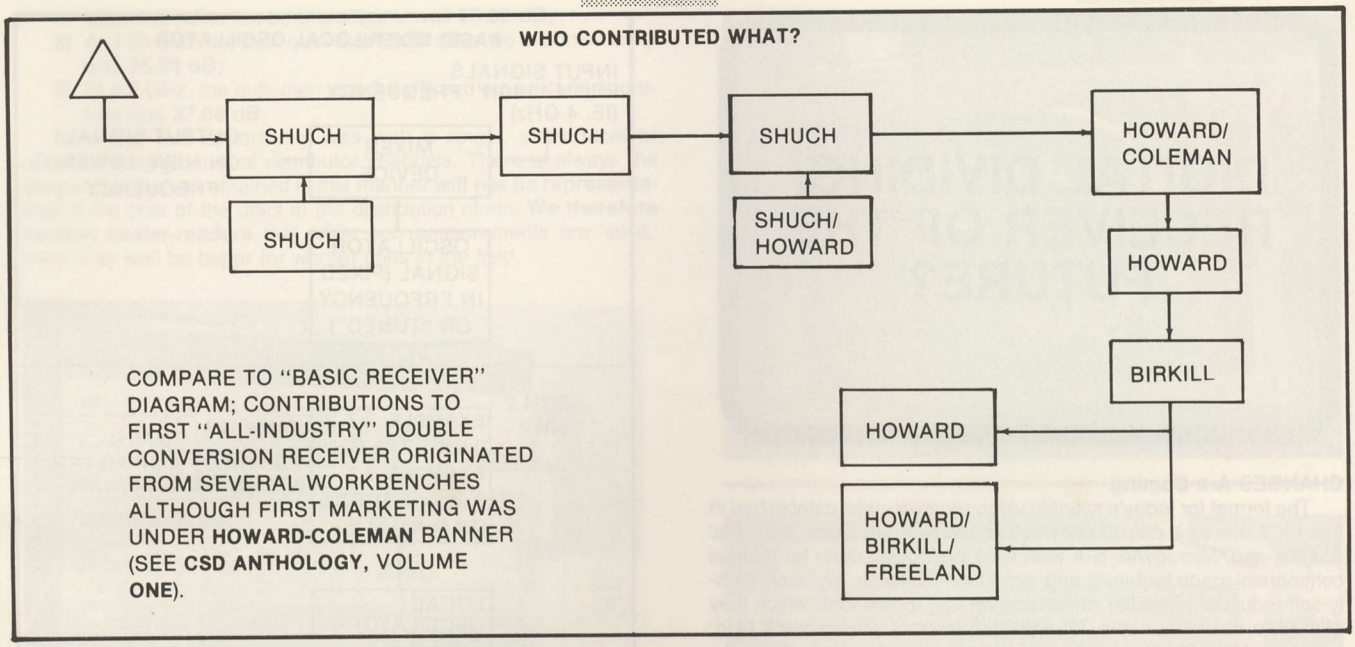
The format for today's satellite video receivers was established in the 1975 era by a pair of commercial receiver suppliers; Scientific Atlanta, and, Microdyne. S-A took work previously done for Intelsat commercial grade terminals and 'simplified' the basic big-buck, highly-self-redundant satellite video receiver into a new form which they offered to the early cable TV satellite pioneers. Prices were high; upwards of $7,500 for a receiver which by today's standards would run a poor second to an Earth Terminals or USS/Maspro comparison.

Microdyne took a different approach. S-A experience was in the double-conversion field and to get the 3.7-4.2 GHz satellite RF signals down to the (standard) 70 MHz IF region, S-A first down converted into the 750 MHz region and then one more time down to the 70 MHz region. Microdyne created a wonderfully complex 'tracking filter' system which allowed them to down convert from 3.7-4.2 GHz straight away to 70 MHz. This was before David Barker had figured out the double-balanced, image-cancelling down converter which makes our single conversion receivers of today practical. Without that image cancellation in the mixer, Microdyne relied on an elaborate tracking filter in the front end (3.7-4.2 GHz region) which allowed the receiver to 'single convert' **without images.** This was also expensive technology and you began to play in the Microdyne ball game when you anted up $7,000 plus per receiver.

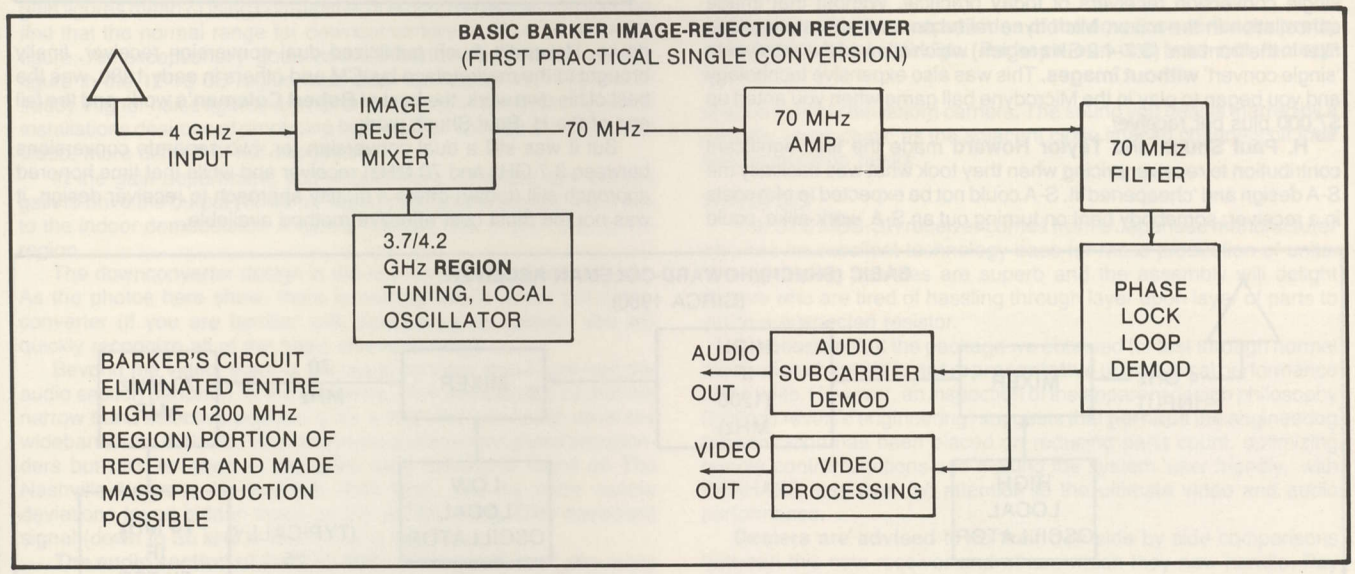
**H. Paul Shuch and Taylor Howard** made the first significant contribution to receiver pricing when they took what was basically the S-A design and 'cheapened' it. S-A could not be expected to trim costs in a receiver; somebody bent on turning out an S-A 'work-alike' could do so. Howard's much publicized dual conversion receiver, finally brought to the marketplace by ICM and others in early 1980, was the best of his own work, the best of **Robert Coleman's** work, and the tail end of the H. Paul Shuch work.

But it was still a dual conversion (or, two separate conversions between 3.7 GHz and 70 MHz) receiver and while that time honored approach still (today) offers a quality approach to receiver design, it was not the most cost effective method available.






**Receiver pioneer David Barker** made the next significant contribution to receiver technology when, in June of 1980, he published in **CSD** his design for an 'image cancelling/double balanced mixer.' Barker had been troubled with the Microdyne approach to single conversion; he didn't see highly costly microwave tracking filters operating in the 3.7-4.2 GHz range as 'cost effective.' He also didn't like the concept that you had to build an 'intermediate/IF' in the 1200 MHz region just as a stepping stone from 3.7 GHz to 70 MHz. He knew, from work in similar fields, that another approach was possible.




He was the first to perfect and show the image cancelling system. It worked so well that he promptly went into an arrangement with KLM, which endures until this day. The Barker circuit and the KLM manufacturing and marketing expertise promptly established the KLM receiver as one of the industry's success stories.

What Barker did was to eliminate an entire segment of a typical receiver; that 'high IF' conversion plus gain block which sat squarely between the microwave band (3.7-4.2 GHz) and the normal 70 MHz IF (band). By one bold step, he was able to eliminate approximately 1/3rd of the receiver's total cost and perhaps 50% of the hard to find parts which slowed down receiver production. Since the introduction and proving of the Barker circuit, virtually every receiver subsequently designed has relied to some extent on Barker's work. You can separate those that continue to follow their own ways on a single hand; they are those receivers which continue to offer 'dual conversion' circuitry.

And that was in June of 1980; nearly four years ago. The only really substantial receiver innovation in the intervening years came from **Keith Anderson** of Anderson Scientific in South Dakota; Anderson designed and proved the **low-cost** block down conversion technique which, like the original Barker circuit, subsequently spawned a dozen or so imitations.

**PACED By Microwave Parts**

With the possible exception of Anderson, virtually all TVRO receiver creativity to date has been paced by the availability of raw microwave parts. In other words, if the microwave transistor and diode (et

**FUTURE RECEIVERS/continues page 15**

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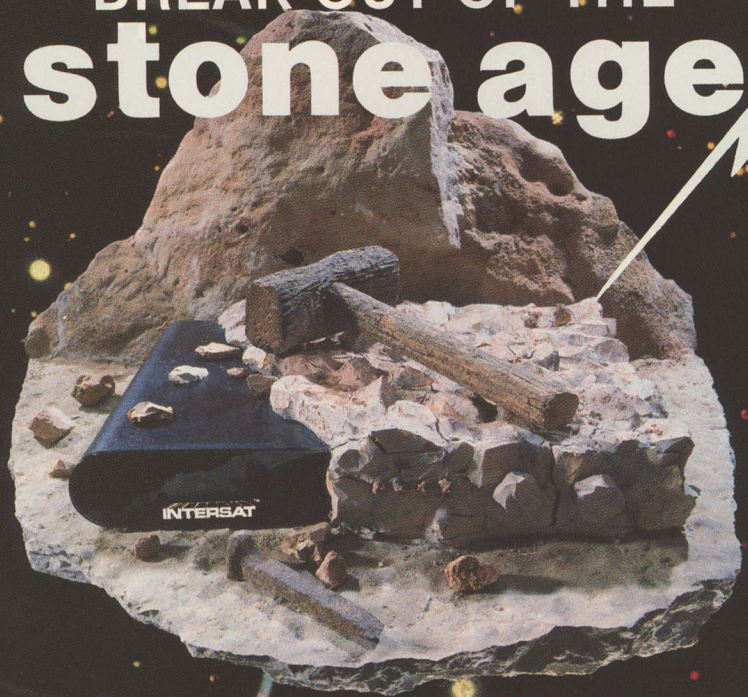


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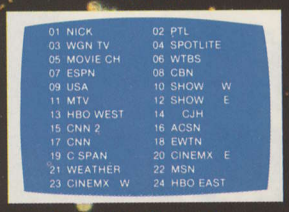


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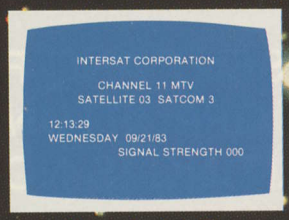
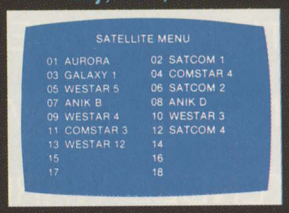



Channel, Satellite, Day, Date, Time

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**FUTURE RECEIVERS/continued from page 12**

al) people have not been creating new approaches to basic microwave **parts,** there is only so much a system design engineer (such as Barker) can do to create new systems.

And with the refinements to Barker's 1980 initial work in the interim years, just about everything that could be done has been done.

**However,** while we have been refining **our** art, others have been refining their own art. And there are some very exciting new microwave parts just ahead which could have a profound effect on the TVRO receivers of perhaps 1985 and beyond. Let's see what this is all about.

**Until now,** all satellite video receivers have been designed around one premise; the 4 GHz region microwave signals must be down **converted** to a lower frequency; the standard 70 MHz 'IF' for example. Once the SHF microwave signals are converted in frequency to 70 MHz, then standard, well known and well understood 'VHF' technology could take over to amplify, filter, process and demodulate those signals.

To frequency convert the signals from 4 GHz to 70 MHz requires at least one highly stable (local) oscillator, functioning itself in the 4 GHz region, and at least one low-loss, high performance 'mixer.' The 4 GHz signals become 70 MHz signals by flowing into the 'mixer' where they meet up with the signal created by the (local) oscillator. Inside of the mixer the 4 GHz region signals from the satellite 'beat against' the (local) oscillator signal and from this 'beating together' a new set of frequencies are created. **One of those new frequencies is 70 MHz** and it is this 70 MHz (IF) signal which we then send through cable from the down converter to the indoor demodulator.

A significant portion of the cost in a modern TVRO receiver found in the actual down converter (which houses the local oscillator and mixer) and an even more significant portion of the performance is established here.

"Mixing" and "beating" signals together has been fundamental to receivers since the dawning of receiver systems. The first 'Super-Het' (AM) radio receivers introduced the art of 'conversion' of frequencies and virtually all receivers of all types have followed that approach to system design in the intervening 60 years or so.

Our TVRO industry is unique; nobody else in the 'receiver business' actually attempts to frequency convert so many signals, one at a time, from such a high frequency to such a low (IF) frequency. Nobody else in the receiver business is working with FM (frequency modulated) signals which are 30 to 36 MHz 'wide.' We, like it or not, have some unusual and quite uncommon design specifications to follow.

### VERY 'Fast' Division

While we have been refining our art, some people in a totally unrelated field have been creating 'faster switches.' On the surface, their 'fast switches' might not seem very important to us.

For some time, the amount of information which a computer can process has been partially limited by how many times per second the circuits inside of the computer can 'switch' on and off. Recall that a computer functions because it can 'switch' and 'count' data submitted to it at a very rapid rate. Computer IC devices have been measured for some years by an 'equivalent operating frequency'; in other words, computer people have been measuring **the speed** of a switching circuit **by relating that speed to some frequency** in the radio spectrum. A computer IC that is capable of switching at the equivalent frequency of 200 MHz (200 megahertz) is pretty fast; or at least it was. It can handle twice as much data (or more) than a computer IC which has an equivalent frequency of **100** MHz. Since the world of computers is paced by 'speed' and the amount of data which can be assimilated, compared and 'routed' internally within the computer is a function of the speed of the switching, there has been ongoing interest in creating **'really fast'** computer IC devices.

Some of us have been exposed to 'fast switching speeds' in other areas; frequency counters, for example. A frequency counter tells you what operating frequency a two-way radio (for example) is on. If you are charged with the responsibility of adjusting a radio so that it is

**FUTURE RECEIVERS/continues page 21**

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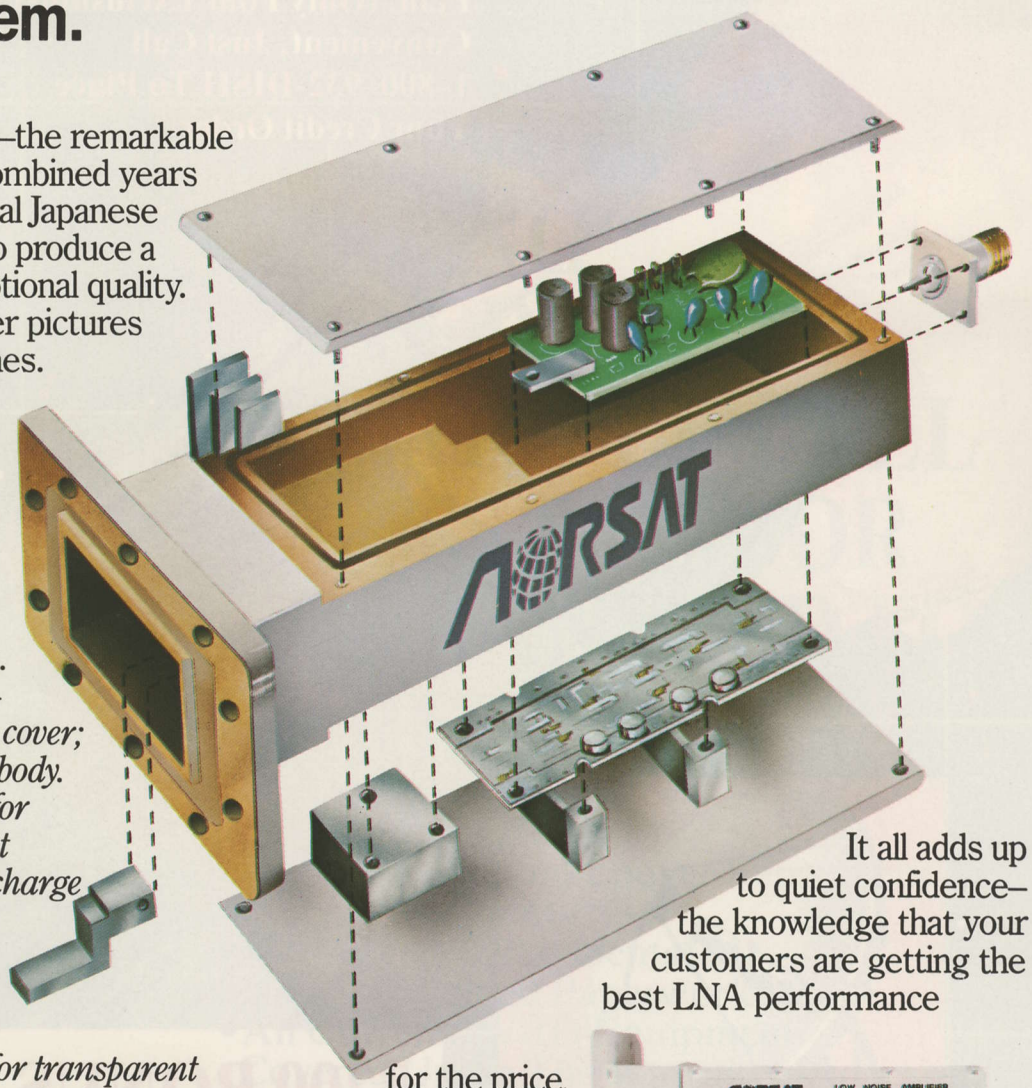


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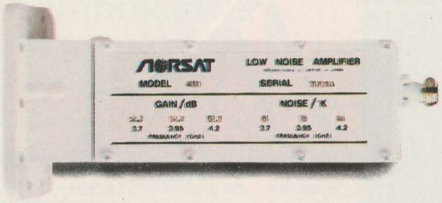


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**FUTURE RECEIVERS/continued from page 15.**

operating precisely on a particular frequency, you use a 'frequency counter' to tweek the radio's oscillator circuit to the precise frequency desired. A frequency counter uses a 'fast IC' device to 'sample' the signal from the transmitter and then read out that frequency for you on a digital display.

**Many of** the modern frequency counters employ either a built-in or 'outboard' circuit called a 'pre-scaler.' This circuit has a very fast computer type of IC inside which **electronically divides** the input signal from the transmitter by some pre-set amount. It can divide the frequency by 2 or 4 or 8 or 10 or virtually any number the designer wishes. Why would frequency counters use pre-scalers? For the same reason we use down converters; to get a very high frequency signal down to a much lower frequency signal where **more accurate** electronic circuits can be employed for the actual counting process.

The art of pre-scalers and divide-by circuits has bumped along with a maximum upper frequency limit in the vicinity of 1.2/1.5 GHz for a couple of years now. But that was before the people who turn out Gallium Arsenide Field Effect Transistors (GaAs-FETs) got interested in the problem.

You probably remember that before there were GaAs-FET transistors for our LNAs, the very best we could do with LNA noise temperature was in the 300 to 350 degree Kelvin region. You can figure out, if you did not know this, that when our very best LNAs were **300 degrees,** we didn't run around looking at Johnny Carson on **ten foot dishes;** they were typically 30 feet in size in those days and not likely to get much smaller **unless** we got better LNAs.

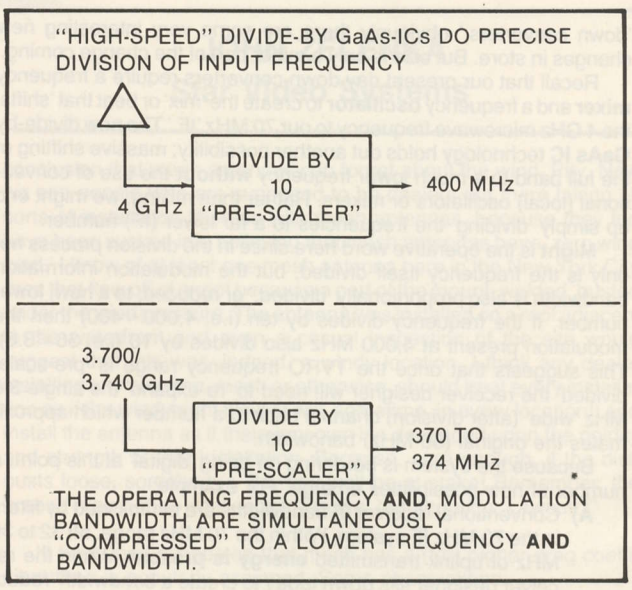
GaAs-FET LNAs came along just when we needed them; about 1976 to be exact, and by 1979 or so they were really making life better for us. The GaAs-FET device is a wonder of modern science; bringing us low noise and high gain in a single package.

**And now we have GaAs-ICs;** or, Gallium Arsenide Integrated Circuits.

The first of the GaAs-IC devices are just now coming out of IC production plants. They have some amazing 'speed.' The HMD-1111-1 is a 1.5 GHz rated '4-bit universal shift register' while the HMD-11016-1 is a 2.0 GHz rated divide-by two/four or eight binary counter. Far 'faster' devices, operational to nearly 10,000 MHz (10 GHz) are due out soon.

Now, how might this impact on home TVRO systems?

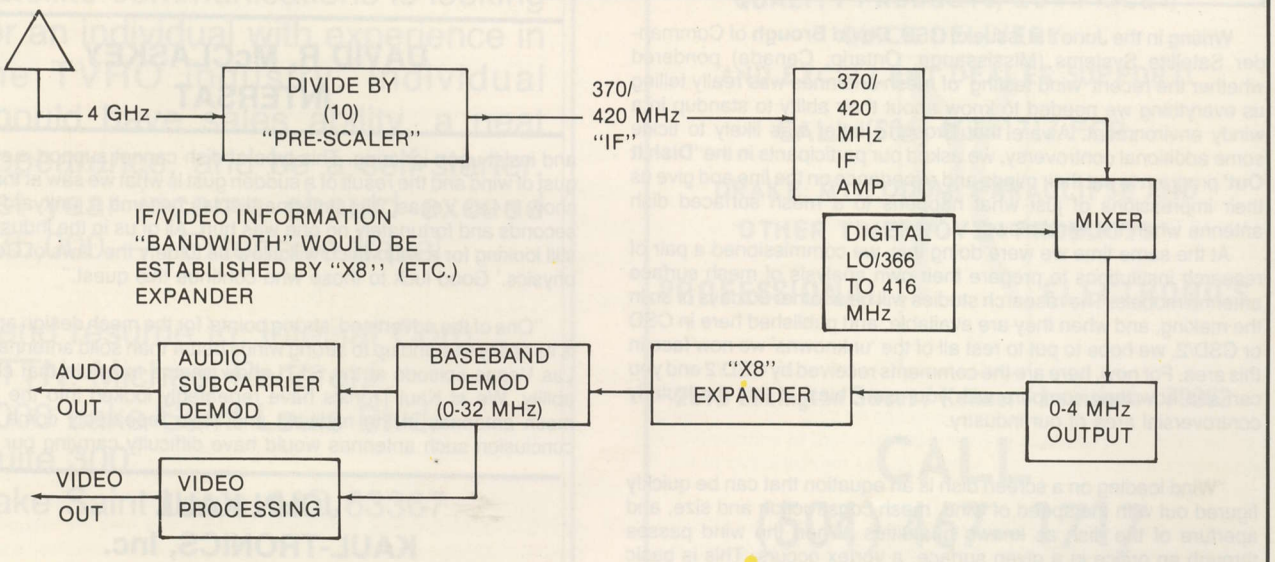
The first devices are being gobbled up by people who design and build highly sophisticated military microwave communications equipment. Entire sub-systems (**example:** mixers, amplifiers, filters) are being replaced by GaAs-ICs which occupy only 1.78 x 2.03 mm (a mm/millimeter is 0.03937 of an inch; 1.78 x 2.03 mm is equal to a space **0.07**" x **0.08**"). The printed number **10,** here, which you have just read, is in actual size just about the same size as the full GaAs-IC which may well be the down converter in your future!




Remember the frequency counters and pre-scalers? Well, a very fast GaAs-IC will not only be very small, but if it was 'programmed' to divide by 10, for example, it would 'shift' (not convert) the 3.7 to 4.2 GHz frequency range down to 370-420 MHz. If you are as fast as that 'shift' you are already wondering **what happened** to those **40 MHz wide** frequency modulated transponders in the 3.7 to 4.2 region when they were **divided by ten** and they ended up spaced in the 370 to 420 MHz region! Yup, their modulation products also just divided by ten as well; a 36 MHz wide transponder at 4 GHz just became a 3.6 MHz wide transponder at 400 MHz. Is that good? Not necessarily. Is that bad? Also, not necessarily; simply challenging!

**If the entire down converter** can be made the size of **10** as printed here, except we then call them **'down shifters'** rather than

**WILL TVRO RECEVIER OF FUTURE ELIMINATE DOWN CONVERTER AND 70 MHz IF?**



'down converters,' obviously there are some very interesting new changes in store. But size is only a minor part of the change coming.

Recall that our present day down converters require a frequency **mixer** and a frequency **oscillator** to create the 'mix' or beat that 'shifts' the 4 GHz microwave frequency to our 70 MHz 'IF.' The new divide-by **GaAs IC** technology holds out another possibility; massive shifting of the full band to a much lower frequency **without** the use of conventional (local) oscillators or mixers. Rather than mixing, we might end up simply 'dividing' the frequencies to a far lower (IF) number.

**Might** is the operative word here since in the division process not only is the frequency itself divided, but the modulation information bandwidth is also proportionally 'divided,' or reduced, to a new, lower number. If the frequency divides by ten (i.e. 4,000 = 400) then the modulation present at 4,000 MHz also divides by 10 (i.e. 36 = 3.6). This suggests that once the TVRO frequency range is 'pre-scale/divided' the receiver designer will need to 're-expand' the single 3.6 MHz 'wide' (after division) channel back to a number which approximates the original (36 MHz) bandwidth.

Because the system is bordering on being 'digital' at this point, a number of new possibilities emerge. For example:

**A)** Conventional receiver IF bandwidths are established by filters in the 70 MHz IF system. Within the 70 MHz range, **all** 32 to 36 MHz of uplink transmitted **energy is present.** When the receiver designer sits down today to create a bandwidth 'reduction' system, he installs filters in the receiver IF to pass whatever portion of the received energy as he wishes to process. For example, while the incoming energy may be 32 MHz 'wide,' the receiver IF 'filter' selected may only be 22 MHz wide. All of the received energy/information **outside of** the 22 MHz 'window' created by the IF filters is simply lost; not used.

**B)** In our divide-by technology, the entire 36 MHz of energy (3.6 MHz wide in our example) can be re-expanded to 7.2 (X2), 18.0 (X5) or virtually any number you wish which is compatible with the original divided-by-width. This suggests that **all** of the original energy **can be kept intact** and receiver video quality will no longer suffer because a receiver designer is forced to throw-away some (significant) portion of the original information to achieve a certain bandwidth and signal to noise ratio.

The TVRO receiver of the future, as soon as late 1985, may indeed have **no** down converter **and** no 70 MHz IF strip! Major portions of the receiver could well end up being on a pair of GaAs-IC devices; one located with the LNA and the other located inside in a postage-stamp size demodulator container.

The new GaAs-IC devices now being supplied are coming primarily from **Harris Microwave Semiconductor, Inc.** (1530 McCarthy Blvd., Milpitas, Ca. 95035; Mr. Bruce Hoffman). As with any brand new technology, there is intense effort being put forth to create circuitry for as many new applications as possible, in the shortest possible period of time. TVRO use of the new technology has **not yet been considered.**

Additionally, the first of the GaAs-IC devices are but the tip of the iceberg for an entire new family of microwave parts. Like the first GaAs-FET transistor units, they are not nearly 'as good' as later generation parts will be. 'Speeds,' sensitivity, the ability to match the devices to 50 ohm loads is all ahead yet. The next twenty four months promises to be extremely exciting in the receiver design area and once we get 'there' we will wonder how we ever managed to function at all with the old fashioned receivers in use today!

# DISH IT OUT!

## ON THE TABLE: 'Mesh vs. Solid Antennas'

**THE OPPORTUNITY TO SPEAK OUT ON ISSUES FACING OUR INDUSTRY TODAY.**

Writing in the June 1st issue of CSD, **David Brough** of Commander Satellite Systems (Mississauga, Ontario, Canada) pondered whether the recent 'wind testing' of mesh antennas was really telling us everything we needed to know about their ablity to standup in a windy environment. Aware that Brough's letter was likely to tickle some additional controversy, we asked our participants in the **'Dish It Out'** program to put their minds and experience on the line and give us their impressions of just what happens to a mesh surfaced dish antenna when the wind blows.

At the same time we were doing this, we commissioned a pair of research institutions to prepare their own analysis of mesh surface antenna models. The research studies will be another 90 days or so in the making, and when they are available, and published here in CSD or CSD/2, we hope to put to rest all of the 'unknowns' we now face in this area. For now, here are the comments received by CSD/2 and you can see how they compare with your own 'bias' in this particularly controversial area of our industry.

### DAVID R. McCLASKEY
### INTERSAT

"Wind loading on a screen dish is an equation that can be quickly figured out with the speed of wind, mesh construction and size, and aperture of the dish as known quantities. When the wind passes through an orifice in a given surface, a vortex occurs. This is basic physics which all of the screen dish manufacturers refuse to believe and insist upon ignoring. This type of dish cannot support a sudden gust of wind and the result of a sudden gust is what we saw at the STTI show in Las Vegas. The antenna display became a junkyard within seconds and fortunately no one was hurt. All of us in the industry are still looking for a way which will allow us to defy the 'laws of God and physics.' Good luck to those who continue this quest."

### JOHN KAUL
### KAUL-TRONICS, Inc.

"One of the advertised 'strong points' for the mesh design antenna is its ability to stand up to strong winds better than solid antennas. The Las Vegas episode at the STTI show seems to refute that claimed ability. We at Kaul-Tronics have repeatedly looked into the use of mesh antennas in the midwest and have repeatedly come to the conclusion such antennas would have difficulty carrying our heavy

snow loads. True, mesh permits more air to pass thru but they are simply not as strong as solid dishes. Oftentimes, during a drive through the countryside, I have seen two, three or more mobile satellite antennas being towed by dealers on trips. I have yet to see a mobile mesh antenna! This leads me to believe that the mesh might not stand up to the wind load while being towed. Mesh certainly does have the feature of better blending into the background (than a solid antenna), but, a mesh antenna must certainly have to be a bigger aperture to deliver the same picture quality as a high quality solid surfaced antenna. And as far as 12 GHz reception is concerned, I would have my doubts about the ability of mesh to function properly at the Ku band frequencies; a combination of the inevitable 'hole size,' and, the surface accuracy required.

"I suggest that the dealer simply inspect, closely, the mesh sieve that is installed in your wife's kitchen faucet. If you take that same sieve and place it in front of a (powerful) fire hose, I am sure that you will find that when the velocity and pressure increases on the sieve,

## GUS WIRTH, Jr.
## Draco Laboratories, Inc.

the mesh turns into a virtually solid surface. The physics of water and air are identical, both react to 'fluid mechanics.' And that should answer the question of what happened at the STTI Las Vegas show!".

"I feel that the reason many of the mesh antennas 'went over' during the STTI Las Vegas show is because many designers treat such antennas as if they have 'zero wind loading.' I'm certain that while the guys with the solid dishes at Vegas were losing sleep 'worrying' about the winds, the guys with the mesh antennas were lulled into a false sense of security and were sleeping like babies! If you carefully read the mesh antenna 'literature,' you must come to the

## JOHN ZELENKA
## Star Video Systems

conclusion that mesh antennas can forget about the wind. Pity. Now we see people who are supposed to be dealers out there taking all sorts of installation liberties with mesh antennas, because they too have been sucked into believing that mesh antennas have 'zero wind load.' I know of at least one mesh antenna here in the New York City area that flew off of a roof because a part of the mount, welded, busted under the wind pressure. The antenna was installed on a roof adjacent to the waterfront and even a casual inspection of the site would suggest that this was, indeed, a windy location. I think any dealer installing any antenna, mesh or otherwise, should treat every installation as if the wind might blow (it will, sometime, in every location!) and install the antenna as if their very own life depended upon the rigidity and strength of that installation. Because, sure enough, if the dish busts loose, somebody's life may well be at stake! Remember, the breeze may not be whispering 'Louise' but shouting 'Lawsuit'!"

"I have long suspected that mesh has a (far) higher drag coefficient than is popularly assumed. Some observations:

1) One only has to hold a windowscreen broadside to a healthy spring wind to appreciate the air-arresting qualities of mesh.
2) In 1977, I tower-mounted a proto-type 12-foot UHF tropo-scatter dish that was covered with a 1" by 2" woven wire surface. Recently I unlocked the revolving azimuth section of the tower and found that the 170 pound dish would rapidly change direction when the wind's direction changed. The mesh or woven wire fabric was 14 gauge and the surface was but 9% 'filled.' Even after the backing plate and ribs were accounted for, the surface was but 35% 'filled.'
3) A leading manufacturer of microwave grid dishes for point-to-

## JIM K. VINES
## PARAFRAME

point repeater systems quotes about 40% windloading for a model that is at most only '20% filled,' even when all of the heavy duty back bracing is accounted for.

So when somebody says that the wind velocity coming out the backside of a dish almost equals the 'input velocity,' what exactly does that prove?

Any fluid, gaseous or liquid, that flows through a mesh screen will accelerate as it flows between the strands of the mesh. And then it will form 'eddies' on the backside of the strands. That is an operational definition of 'drag.'

Now as to why 'some' mesh dishes at the STTI show in Las Vegas took a beating, and others did not, could be attributed to any number of things. I can only suggest some possibilities:

**1)** Careless assembly;
**2)** The parabolic framework was structurally insufficient;
**3)** The mount was structurally insufficient;
**4)** The mesh fasteners were insufficient in strength or in number.

There is no reason why a mesh dish cannot be built to survive 100 MPH (40 PSF), let alone the 50 MPH (10 PSF) windloads. It would be an interesting 'total antenna design exercise,' especially for apertures ranging from 14 to 50 feet in size."

In our June 'Dish It Out' questions, **we also asked Advisors** how they feel the present 12 GHz DBS efforts from USCI might be better directed. The evidence suggests strongly the USCI may be facing severe financial problems with their service and we were concerned that the failure of the early 12 GHz DBS program might ultimately reflect badly on the growth opportunities for firms in the 4 GHz (DBS) field. Some selected responses follow.

"Judging the success (or lack thereof) of the Radio Shack/Prudential/General Instrument (USCI) fiasco, DBS is far from the imminent threat that was 'feared' by most C-band suppliers a short time ago.

The basic shortcoming of the USCI venture thus far appears to be marketing. They have been trying to sell ice to Eskimos. The thrust of their marketing has been directed at the heavily populated urban areas, much of which already receives 12 to 40 channels from their local, friendly, cable operator (or plenty of off-air service). So why would a guy who's paying $25 to $40 a month for cable and receiving up to 40 channels want to pay essentially the same amount of money

## JOSEPH IOZZI
## Sync Satellite Systems

to get five channels? I think the USCI DBS service will have better luck out in the boondocks, if and when they start directing their marketing that way. But, that alone will not solve the major problem; which is that C-band offers 80+ channels while (USCI) DBS offers but five.

The feedback I get from most consumers is that they would rather pay a little extra for additional programming available (only) on C-band. There is also a pride-of-ownership syndrome that is bigger than most marketing experts are aware of. Lastly, **nobody** likes a monthly payment that will NEVER be paid in full!

I feel that for 12 GHz to be successful in the consumer arena, the fee cannot exceed $15 per month and $295 should be the top price for the equipment. The biggest impact on C-band suppliers, I feel, will come not from DBS, but from who or how many of the C-band services scramble. The recent proposal to Congress for a bill making it mandatory for such programmers to offer descramblers to consumers at a reasonable price even further enhances the marketability of the C-band equipment."

"When the 4 versus 12 GHz wars REALLY begin, the 4 GHz guys need to be wearing white hats. We would be foolish to try to help them straighten out their present mess!" **(McClaskey).**

"I have been watching the present USCI DBS service since February, and I can see many shortcomings to their offering. It appears to be a **'cable company in space.'** In effect, does the consumer want the movie/program choice made for him, or does he (the consumer) want to make that choice? On top of this, they insist of having 'the whole pie.'

If it was difficult to get through the door to the major entertainment guys, it is impossible to get through the door to these guys. They are (trying to) market to private homes themselves. They want that action.

It is also amusing to me that they went with RCA to do their installations, ignoring **totally** the available pool of people and firms in the C band business who are already doing just that kind of work. I have no grudge; indeed, can I afford to hold a grudge? Smaller antennas, even at C-band, are a technological fact of life which I would prefer not to deny. I am not so entrenched in old habits that a new idea seems bad because it somehow threatens my current position.

Five channels may well be 'enough' for some people, but it is certainly not the 'last word' in what space has to offer. I look forward, with some anticipation, to the 'next' DBS launch from the monied folks at COMSAT. They will surely 'profit' from the USCI experience to date and do things differently. C-band is certainly not threatened by 12 GHz DBS; the Ku band service is simply 'another beacon lighting up the global village' (Zelenka)."

**Readers with different views are invited to submit them to CSD/2 Feedback,** P.O. Box 100858, Fort Lauderdale, Fl. 33310.

**CSD/2** has a growing list of **'industry advisors'** who participate in the **'Dish It Out'** program. Each month we send out a pair of questions to those on our advisor-list and ask them to comment on one or both of the questions. From the answers received, we prepare this column each month. If you feel you would like the opportunity to participate in the initial question-sequence, drop a note to **Carol Graba, CSD/2 Magazine, P.O. Box 100858, Fort Lauderdale, FL. 33310** and ask to be added to the 'Dish It Out' Advisory List!

## CSD FEEDBACK

**THIS MONTH: Responsibility/ Luxor vs. STS**

In Feedback this month, installing dealer **Henri Guerin** of **New Mexico Satellite** (Rt. 9, Box 86DD, Santa Fe, New Mexico 87501; 505/982-5095) writes about the problems he has had getting warranty repairs completed for STS delivered Luxor receivers. As most readers are aware, Luxor was initially introduced to North America by STS. This past winter, STS and Luxor 'split' and Luxor is now marketing 'direct,' while STS has introduced a new receiver of their own **(see early-evaluation-review in this issue of CSD/2).** With the dissolution of the 'marriage' apparently has come a myriad of problems for those dealers who had purchased STS-Luxor gear through distributors. Guerin writes about that and the comments and observations he makes are his and his alone. Other dealers with views on this subject are invited to submit them to **CSD/2 Feedback,** P.O. Box 100858, Ft. Lauderdale, Fl. 33310.

"Six months ago we purchased several Luxor receivers with STS downconverters; about two dozen all told. We had the 'usual' 20% instant mortality rate (dead out of the box). And we returned these to the distributor which we purchased them from. There was no immedi-

ate exchange so we had to wait for perhaps 8 weeks to get them repaired and eventually returned. And out of **that** batch, we had some that had to be returned a second time because they were still not 'right.' Well, business as usual!

In the meantime we sold and installed those units that appeared to work as they came out of the boxes. And, they began to 'break.' We replaced them with inexpensive 'loaner' receivers during the time we were attempting to get the broken units repaired. As you might suspect, the customer calls became as obsessive as 'Where Is My MTV!' except they were asking 'Where Is My Luxor!'. They definitely had a right to know what happened to their $3,500 plus. With the best patience we could muster, we would explain there was 'some delay' in the repair process and that we had taken the situation into consideration and would 'work out some form of compensation.' It often ended up that we were forced, for our own good-will, to throw in a Luxor 9356 remote control 'for free'!

**The real problem,** meanwhile, was that Luxor and STS were fighting it out in the courts and press, without any apparent real concern for the end customer. **Or anybody in between.** One month ago we eventually ended up with 12 (out of 24) ailing units; their problems ranged from minor (but beyond our ability to repair) to critical.

First we had to identify the problem. Was it the receiver, or was it the downconverter? We had to make absolutely sure it was not the LNA, not any cable, not a fitting, not the antenna and so on. This was good practice, took tens of hours, and of course was plenty of fun for all concerned!

Out of the 12 ailing units, we eventually ended up with 6 that we solved by swapping around amongst the downconverters and the receivers. In other words, we found six receivers that would work with six down converters; although not the original pairing in any of the cases. Now is where Excedrin Headache Number 2 began.

**We still had six of the STS/Luxor units.** We were not technically equipped to repair them. We had certain technical abilities and the experience to readjust certain things within the Luxor which needed some occasional field help (IF, AGC, modulator, etc.). We also had some basic experience with the STS downconverter problems (drifting, lack of gain, when STS changed the LNA voltage from 18 volts DC to 12 volts DC and so on). But we could not get the last six to 'play.' The logical thing to do was to return them to the distributor.

That meant a guaranteed 6 to 8 week delay. Surely, they had our money for months now and we still could not 'turn' that money; there had to be a faster way. **How about STS?** They, afterall, sold us the units through the distributor. **Or, how about Luxor?** They made the units and they were the ones who had a contract with STS.

We called STS first and were told to send the units through our distributor. We argued that we would save time by sending them in directly. Fine; they agreed to 'look at' the STS downconverters but refused to accept the Luxor receivers. **'We have nothing to do with Luxor, any longer,'** they told us.

We called Luxor/Magnum Microwave second. They told us to send the units to one of their distributors who was close to us. We do not do business with that distributor and told them we did not care to send anything to them. They finally agreed to call us back.

The next day they did call back, and told us to go ahead and return the problem units to them. They wanted the symptoms and the serial numbers, which we gathered and returned to them the following day. **This time** they told us there had been 'a misunderstanding.' They would accept the Luxor receivers with a Magnum downconverter; **but not** with an STS downconverter. and, they said, **'we have nothing to do with STS anymore.'** I already knew that!

So who was going to service the faulty **combination**???

Luxor would not look at the package of equipment because **they** did not manufacture the downconverter. STS was not going to look at the package of equipment because **they** did not manufacture the receiver!

From telephone call to call, with no '800 numbers' involved, we managed to spend a lot of time, not a few dollars, and we were no closer to a solution than when we started. Others were calling as well;

## WARNING!!! DEALERS AND DISTRIBUTORS

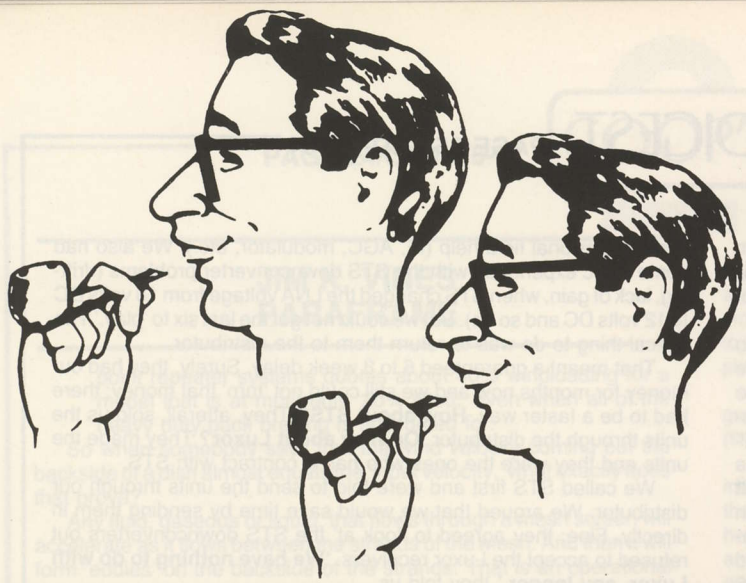
Counterfeit copies of Anderson Scientifics' model ST1000 satellite receivers being produced in Korea and being marketed in the United States and Canada based upon misrepresentations. The units have an appearance almost identical to the actual ST1000's. These counterfeit receivers have very poor and very inconsistent quality.

The counterfeit receivers are being marketed by several different firms claiming to be Master Distributors of Anderson Scientific, and variously claiming that Anderson Scientific has been purchased by Oriental firms. These claims are false!

To insure that you are purchasing a high quality unit, purchase your model ST1000's directly from Anderson Scientific or associated authorized distributors listed in Anderson Scientific advertising. If you suspect you have purchased a counterfeit copy, or have been contacted by a firm attempting to market a counterfeit copy, please contact Karl Martin with Anderson Scientific at (605) 341-3781. Legal action is being taken to seek legal redress against the unauthorized distribution and/or knowing possession of these counterfeit receivers.

Help us to protect the quality reputation of American industry. Thank you very much for your assistance and cooperation.

Mark Anderson, President
Anderson Scientific, Inc.



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our customers. It is a funny thing about people who have $3,500 and up to spend on a TVRO system; they ALL seem to have good attorneys! And now we were hearing from their attorneys. Ooops.

But what was this; a ray of light at the end of the tunnel? Luxor was now suggesting that we purchase a Magum downconverter. At a very special price. And if **that** did not solve the problem, they would THEN take the units back for repair. After we 'chucked' the STS downconverters. I had to admit that was a pretty clever way to sell some more downconverters. It was probably even better than having somebody at STS slam the telephone down on you.

As a dealer, it is my first priority to have a happy, satisfied, customer. The pressure became so intense that I replaced two of the Luxor/STS package systems with 'brand X' equipment. Now I have two useless Luxor/STS packages sitting here, quite a few dollars sitting idle, and little hope of bailing out. But all is not lost. I now have two very happy customers who even sent my wife flowers on Mother's Day this year!

But I still have four very unhappy customers who are tiring of the 'loaner,' low-grade receivers they are using while awaiting the magic repair of their Luxor/STS units.

What ever happened to quality control (a 20% infant mortality rate is not unusual, heaven knows; but, why do **we** have to put up with this!)? What ever happened to service-after-the-sale (sure, the Luxor/STS situation is 'unique' but doesn't anyone, either of these two firms, CARE that it will be a hot day in December before I ever consider buying products form either one again!)? Is there total disregard for the dealer, and the end-customer? I wonder.

I doubt I am the ONLY dealer in this 'catch 22' position. I would like other dealers caught in a similar spot to communicate with me, directly. All such letters or telephone calls will be kept confidential. I believe that a coalition of dealers/distributors caught in the middle on this one could pressure these two OEMs to act in a responsible fashion. Here are some of my suggested solutions, if you are as concerned as I am about keeping your reputation in your market area, or realizing your own maximum growth:

1) A class action suit could be brought against the OEMs mentioned, representing both dealers **and** customers affected;
2) There could be a recall of all units that fail to work, and a refund for the dollars we have spent to place those units on our shelves;
3) Failing the above two, an organized 'boycott' against all products manufactured by either firm.

Remember, without you, the dealer, the OEMs would not have grown to their present strength. It is time, I believe, to send them a message that the whole industry would profit from, rather than taking it on the chin at the dealer level and subjecting ourselves to a tarnished image. If, after this appears in **CSD/2,** I discover that nobody but me cares, I suppose I can always go back to tending my garden!

Henri Guerin

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DBS in Canada is delayed and is presently ailing. **Northstar Home Theatre** plans to act as the retailer for a package of signals which would include pay television, educational services and specialty programming.

You will recall that USCI went up on the Anik C2 satellite last November. There have been a number of rumors circulating within the industry concerning the viability of the USCI service. Their problems are mainly financial: high start up costs, high transponder costs, and not enough subscribers. The USCI founders/management team have left the venture, and the company has been seeking a major infusion of new capital.

Northstar's dilemma is a little different. Northstar would provide encoders to each pay-tv company (First Choice Canadian and Superchannel) which is operating on the Anik C3 satellite. The actual transponder costs would be picked up by the pay-tv companies, Northstar only provides the security for the signal, and marketing assistance. Northstar would sell the pay-tv services to subscribers, remitting the appropriate fees through local satellite dealers. There would also be monthly service charges.

Northstar's subscribers would get a TVRO, including a receiver with decoder. Subscribers would then get a package of encoded and conventional signals.

The technology works well, so well, says Northstar's spokesman Claude Lewis, that many people can use 1.5 or 1.2 metre dishes, rather than the more costly 1.8 metre dishes which were previously part of the package. That has brought the selling price down from $1,500 (Canadian) to $1,395 (Canadian). The decoders have been designed, the 'chips' are fairly cheap, and, reliable.

**The problem?** Signals. As we mentioned in the May 1st CSD, the East Coast pay-tv service is in receivership. Several attempts have been made to get it re-started, but to date, there are problems. The East Coast is one of the major market areas for Northstar. Then, rumors started to abound concerning the surviving pay-tv companies: First Choice and Superchannel. **Merger rumors.**

Along the way, Premier Choix French language pay-tv merged with its competitor TVEC. The service has used two spot beams to reach all Canadian homes. The problem is that outside of Quebec and Ontario (the eastern spot beam), there are only a couple of hundred subscribers to the French language services. A 12 GHz transponder is a mighty expensive thing when your up-link costs are around $100,000 per year, and you serve under 1,000 homes. Also, a 4 GHz national beam covers the U.S., and costs $400,000 per year **less.** Needless to say, the merged TVEC/Premier Choix is looking to 4 GHz as the more economical way of getting full national coverage, and when their lease runs out for 12 GHz in August, you **may see** some changes.

But, you'll note a common theme or a common thread running through all of this. No matter how attractive the price of the hardware becomes, the real nitty gritty is the "software — the programming." At under $1,000 (Canadian) wholesale, dealers may be able to sell DBS equipment for your second tv set, or for your summer home, but it is going to be an uphill battle. I wish Northstar a lot of luck, because they will need a better programming package.

The new MUCHMUSIC and Labatts **all sports** channels have also looked at 4 GHz since their programming is not time-sensitive, and they really need a full national beam, not spot beams. Which leads us to the question, how the heck do you sell "DBS" with one pay-tv channel and maybe one educational channel? How do you sell a $1,395 service (plus $100 installation fee), in a universe where 6 & 8 foot 4 GHz dishes are becoming the "norm" in Western Canada and **a drug store chain** (London Drugs) sells complete systems for $1,995?

Also, the 12 GHz dish, as presently configured, **doesn't move.** That means you can't aim it at NBC, or other services on 12 GHz. Besides, the 12 GHz system might be incompatible with the next generation of **real** DBS services, come 1986-87. There has been a lot of talk concerning a new transmission standard, and the British have been out talking about their MAC standard.

The other problem concerns SMATV. There has been a lot of discussion over who can sell to the SMATV market: Northstar or the pay tv company(s). At the moment, Northstar is being held at bay and their investors are also watching USCI, which is "rumored" to be installing 6-7,000 units per month.

**Mark L. Lewis**

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**NEW PRODUCTS/continued from page 6**

related 'art' which the dealer can simply 'clip' and use in preparing newspaper advertising, fliers and other promotional materials. Included are drawings for mounts, feeds, dishes, receivers, special headlines, artwork that suits TVRO ads and a host of advertising-related materials.

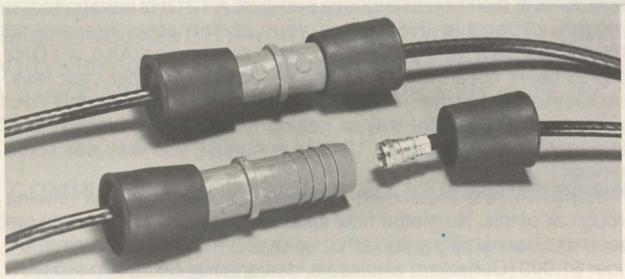
**WESTERN WISCONSIN Satellite TV** (Spring Valley, Wisconsin 54767; 715/778-5714) has created an interesting new tool which they claim will allow anyone to find TRUE NORTH within five minutes time. The True-North Satellite Alignment Tool eliminates the need for a compass, is designed to function with most dish designs, is lightweight and portable. A patent is pending.

**OUTDOOR RELATED EQUIPMENT**

**ADVANCED TECHNICAL DESIGNS** (P.O. Box 740, Gravette, Arkansas 72736; 501/787-6794) has an automatic antenna positioner called the 'ATD Dialer 1.' The unit features a single-turn, continuously

variable dial for an 'unlimited' number of satellite positions. The actuator uses a potentiometer screw gear tracking the dial itself. Peel off, stick on labels are provided for the control to identify the individual satellite locations. With this system, there is 'no loss of satellite' memory positions when power fails. The motor operates from 36 Volts and there is an expanding, contracting boot over the tube assembly. It has been tested to 1300 pounds of thrust capacity. Pricing for small dealer quantities is under $300.

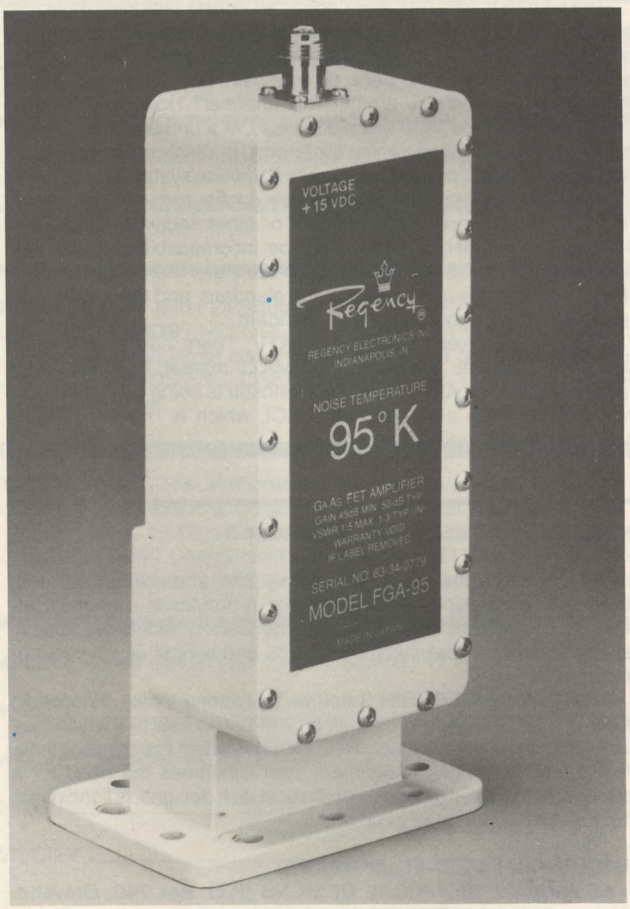
**BASIC SYSTEMS** (1919 South 129 East Avenue, Tulsa, Oklahoma 74108; 918/437-7066) has announced a new line of 36 VDC satellite antenna positioners. Model 2350 features an infrared remote control while model 2300 is user-direct-accessed. Both units have 16 programmable satellite locations, programmed with front panel located pots. The system uses a mechanical memory and is not affected by power interruptions. Both models have electronic motor overload, limit switches and electronic program limit protection. The Acme Screw type of drive has lower power consumption than competitive systems. With a 24 inch actuator, 125 feet of cable, the 2300 system nets to dealers for $334.59 in 10-lots. The infrared controlled version, model 2350, adds $30 to the system cost in 10-lots.



**CC16 connector security from CWY, Inc.**

**CWY ELECTRONICS** (P.O. Box 489, Brazil, Indiana 47834; 1-800-428-7595, or, 1-800-382-7516 in Indiana) has announced a new model CC16 connector cover as an alternative to heat shrink tubing, tape or other methods of securing outdoor connectors against the ingress of moisture. The new cover is designed to fit RG-59 and RG-6 type cable connectors.

**REGENCY ELECTRONICS, Inc.** (7707 Records Street, Indianapolis, Indiana 46226; 317/545-4281) has added a 95 degree LNA to their growing line of TVRO related products. The LNA-95 has a minimum gain specification of 47 dB. The suggested US resale (i.e. retail) price is $499.




**REGENCY LNA-95 at 47 dB of gain.**

**PROGRAMMING SERVICES.**

**FANTASY UNRESTRICTED NETWORK** (F.U.N., through Space Age Video Distributors, 2902 Almaden Expressway, San Jose, Ca. 95125; 408/559-8812) was scheduled to begin routine subscriber service on June 2nd on Westar 5, transponder 22. The service is available five days per week and features X rated adult motion pictures. The service is scrambled and according to Space Age orders for decoder units are now being processed within ten working days. The price for the descrambler is $125 while the full year of programming nets to the user for $150.00.

**THE PLEASURE CHANNEL** (1940 S. Cotner Avenue, Los Angeles, Ca. 90025; 800/448-3151 or 213/477-8045) was scheduled to begin regular service on Westar V, transponder 11**X** at 11:30 PM on June 1st. The service is to provide 'hot' and 'soft-X' rated movies for adults and will program from 11 PM to 5 AM on weekdays and 11:30 PM to 5:30 AM on weekends. There is to be a pair of films each night, with a repeat (four feature-periods in all) in the middle of the transmission set. The decoder has a one-time cost of $350 while the annual fee for the programming service is $100.

**PERSONNEL**

**DAVE MULLENAX** has been appointed President of International Video Communications Corporation (North Little Rock, Arkansas). He has held the position of Vice President since February of 1983. IVC is a distributor of TVRO hardware systems and marketing programs for TVRO hardware.

**TIM WRIGHT** has joined Uniden Corporation of America Satellite Technology Group as western regional sales manager. Wright was formerly with the Intersat Corporation of St. Louis.

**CALENDAR**/ Through July 30th

JUN 15/17: SMATV/Private Cable workshop, sponsored by Burrull Communications, in Portland, Oregon. Contact 608/873-4903.

JUN 19/21: Jerrold MATV/CATV/SMATV Technical Seminar, Kansas City. Contact Kathy Stangl, 215/674-4800.

JUN 20/21: Trans-Atlantic Satellite Information Product Showcase at the U.S. Embassy, London. Contact Larry Hannon at 904/237-6106.

**ATTENTION OEMS/Distributors:** CSD/2, published on the 15th of each month, provides you with the opportunity to announce to the worldwide TVRO dealer network recent additions to your product line, new services and changes in personnel. Please place Carol Graba **(CSD/2, P.O. Box 100858, Ft. Lauderdale, Fl. 33310)** on your mailing list to receive press/news releases and other forms of announcements which you wish to share with the full industry. **Deadlines** for inclusion in the next issue are **June 25th** for the July 15th issue of CSD/2. This publication is the mid-month companion to Coop's Satellite Digest (CSD) which has been issued on the 1st of each month since October of 1979. CSD/2 is read by all of the CSD subscribers in the USA, by selected dealers outside the USA, and, by the full **'Dealer Membership'** in SPACE, the international trade association of the TVRO industry.

# EARTH STATION RECEIVER


## ESR324 RECEIVER

### FULL PERFORMANCE SATELLITE TV RECEPTION

- Digital Channel Readout • Attractive Styling
- Detent Channel Tuning • Normal/Inverted Video Switching
- Preset 6.8 and Variable Audio Tuning for All Subcarriers
- Channel "Scan" Function • FCC Approved Modulator Available
- Polarotor™ Interface Standard with Polarity "Skew" Control
- Matching Stereo Adaptor Available

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Telex: 288-017

PIONEER MEMBER OF SPACE

JUN 21/22: Understanding Telecommunications Technology For Non-Engineers; covering cable and satellite concepts, New York City. Contact 703/734-7050.

JUN 22/24: SMATV/Private Cable workshop, sponsored by Burrull Communications, in San Francisco. Contact 608/873-4903.

JUN 28/29: Terrestrial Interference Seminar, sponsored by Microwave Filter Company, E. Syracuse, New York. Contact Bill Bostick at 315/437-3953.

JUL 10/12: CABLE '84, London, England Wembley Conference Center. Contact 212/398-1177 (US) or 01-868 4466 UK.

JUL 10/12: Jerrold MATV/CATV/SMATV Technical Seminar, Williamsport, Pa. Contact Kathy Stangl, 215/674-4800.

JUL 20/22: SMATV/Private Cable workshop, sponsored by Burrull Communications, in Boston. Contact 608/873-4903.

JUL 30/31: Home Satellite TV Conference, Wisconsin Center, University of Wisconsin. Contact Heather Goldfoot at 608/262-6512.

**BIRD ACTIVITY UPDATE**

**96° W/ Telstar:** Continued increased loading with CBS beginning regular feeds to 25 on June 1st on TR2 initially; several additional CBS transponders will be activated. ABC service (TR10 and 12) excellent in Hawaii on good grade 12 footers.

**120°W/SpaceNet:** Testing of this new hybrid (C and Ku) band bird should be underway before 1 July. Primary users will be various religious groups establishing 'national' service and teleconferencing nets.

**132° W/ Satcom 3R:** Tests conducted south of the equator, on Tahiti in the Pacific, reveals at least two transponders are usable on 30 foot range antennas. **Details in CSD** for July 1st.

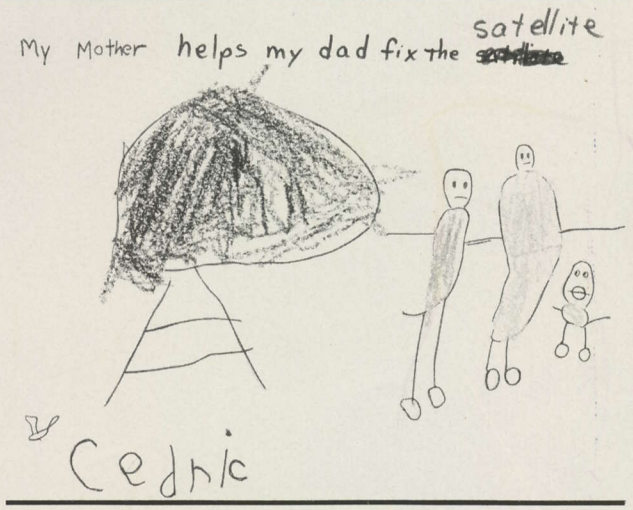
**JUST For Fun**

For several months **CSD/2** has been publishing industry 'bumper stickers' from dealers (et al) who have 'graduated' to the bumper-sticker class of marketing.

Now it's time for some graduate-level stuff.

Dealer **Henri Guerin** of Santa Fe, New Mexico (see CSD/2 Feedback, this issue, page 24) contributes this drawing completed by his son Cedric as a part of his school excercises. We'd guess Cedric is as far as the 1st grade, or perhaps still in Kindergarten. To really appreciate this (the satellite dish is obviously having problems, tilted over towards the ground!), you need to go back and read Guerin's letter on page 24 here. Someplace in this system is an STS/Luxor down-converter/receiver combination, we suspect.

Bumper stickers, or student art, for consideration in CSD/2's **'Just For Fun'** section should be addressed to **CSD/2 Bumper Stickers, P.O. Box 100858, Ft. Lauderdale, Fl. 33310.**



# AiMERS BY DRACO RIGHT ON


## AIMER III

The complete answer to satellite dish movement and polarotor control. Up to 64 satellite locations with microprocessor accuracy of position and polarotor. Easy to use — simply turn the knob until the satellite reads out and push "GO TO." The Aimer III does the rest. Built-in power supply — low profile — superb styling.

## ACTUATOR GIMBAL BRACKET

Eliminates side and up and down pull on the Actuator. Prevents premature failure of the power drive unit.


## AIMER II

Precise antenna movement with push button ease. Built-in power supply, dynamic breaking. A solid solution to low cost dish power positioners.

## POWER ACTUATOR

Designed and built for satellite dish movement. Sealed tubes, solid lubrication, gimbal rod end, Timken roller bearings, anti-jamming. Rated at over 2000 lbs. The Draco Power Actuator operates at 12 to 36 volts with self-resetting current protection. Infrared light eruptors are impervious to all electrical interference. Positively the best Actuator built.

***FOR MORE INFORMATION CONTACT:***

**DRACO LABORATORIES, INC.**
1005 Washington Street
Grafton, Wisconsin 53024 U.S.A.
**Phone: 414-377-0770**
**Telex: 26886**

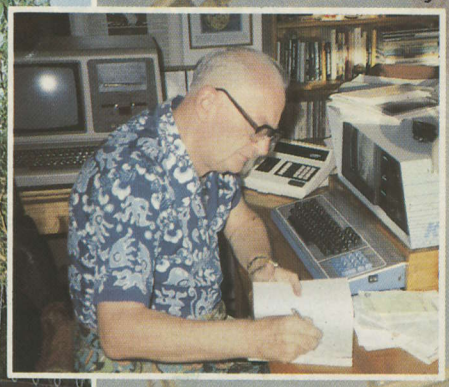
DRACO

**DISTRIBUTORS:** WISCONSIN: **Delta Satellite Corporation,** Cedarburg, WI 414-375-1000, Nat'l 800-558-5582, Wisc. 800-242-2290. NEW YORK: **Satellite Video Services,** Palenville, NY 518-678-9306. OREGON: **Von's Total Television Center,** Eugene, OR 503-342-1618. OHIO: **Satco U.S.A.,** New Philadelphia, OH, Nat'l 800-362-8619, Ohio 800-362-6781. FLORIDA: **United Communications Supply,** Tampa, FL 813-971-1648. UTAH: **Video Link,** Salt Lake City, UT 801-278-2878. TENNESSEE: **Cox Enterprises,** Rockwood, TN 615-354-3471. CANADA: **Ground Control,** Concorde, Ontario 416-669-6366. **Satellite Systems Ltd.,** Burnaby, B.C. 604-430-4040. **Videosat Canada LTEE,** Charney, Quebec 418-832-4621. TEXAS: **Morgan Satellite Systems,** Hughes Spring, TX 214-639-7517.

# Arthur C. Clarke: A Brilliant Prediction

The 4.8 meter under construction.

Arthur C. Clarke (r.) with David Johnson of Paradigm and the new 4.8 meter Paraclipse.



Arthur Clarke in his study.

12 years before the launch of Sputnik, 17 years before the first communications satellite and some 30 years before the first experimental broadcast satellites, Arthur C. Clarke published his now famous technical paper in the British scientific journal Wireless World.

In his article titled "Extra Terrestrial Relays" Clarke described with near perfect precision the very same telecommunications satellite system we use today. For his brilliant theoretical work, Clarke has received awards and honors from all over the world. The Clarke Orbit Belt is named for him.

In November of 1983 an international group of 29 industry-related people lead by publisher Bob Cooper, traveled from all over the world to Colombo, Sri Lanka where Clarke lives.

For 4 years Bob had championed the idea of industry representatives donating their equipment and energies toward the building of a satellite earthstation at Arthur Clarke's home.

The response from the industry was so unanimous and overwhelming that the gesture soon grew to include two systems for the Arthur C. Clarke Center for Modern Technologies at the nearby university, in addition to the system for Mr. Clarke's home.

We at Paradigm Manufacturing feel especially proud about being asked to participate in the journey and at having our equipment chosen as the hardware to be installed at Arthur C. Clarke's home.



**Paraclipse**

HIGH PERFORMANCE
SATELLITE TELEVISION SYSTEM